MAGAZINE

OF

ZOOLOGY AND BOTANY.

ORIGINAL COMMUNICATIONS.

I.—*Historical Notice of Antoine Laurent de Jussieu.* By M. Ad. Brongniart. *

The History of Science shows us that there are men who have been occupied during their whole life with a single idea, but that, an idea of great importance and fruitful in results—men who have exercised, even by works of apparently less extent than those of many other inquirers, a vital influence on the progress of science, because the works which they produce are often the base of the edifice which their contemporaries and successors only serve to complete.

Such may be said to be the case with the individual to whose memory the following pages are devoted ; an individual celebrated throughout the scientific world, and venerated by every one who knew him. It may be affirmed that all his reputation was acquired by the publication of a single volume: his preceding works were only a prelude to this, and those that followed merely the developement of it ; and, notwithstanding their importance, every one will acknowledge that they were not necessary to add to the fame of the author of the *Genera Plantarum secundum ordines naturales disposita*. This unique volume contains the most profound exposition of the whole vegetable kingdom, and is as remarkable for the excellence of its principles as the perfection of its details. It is doubtless sufficient to confer on its author the high reputation which he

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enjoyed, and which has continued to increase in proportion as his work became better known and its principles more fully understood, discussed, and applied, whether by A. L. de Jussieu himself, or by those botanists who have followed his steps.

What more convincing proof can be given of the superiority of the principles on which this work is founded, than its general adoption by all the most distinguished botanists of Europe, who have no doubt sometimes modified it and brought it nearer perfection, but who have all assumed Jussieu's work as the point of their departure, and most of them may even be said to have deviated but little from it?

It may, however, be asked, if this natural method, as it is explained in the admirable work alluded to, is destined to a lasting reign—if it is, in short, the method most accordant with nature—or if, like so many other systems, it is likely to enjoy but a limited duration, and be replaced by some other method. If we consult only the history of the sciences, and in particular that of botany, we shall be inclined to believe that the predominance of the Jussieuan method will be temporary, like those of Ray, Tournefort, Linné, &c. and that it will be superseded, at a nearer or remote period, by a method more adapted to the progress of the sciences.

When we consider only the systematic portion of Jussieu's work, it may be perceived that important changes may be introduced in many parts of it; and modifications more or less commendable have in fact been already proposed by the numerous inquirers who have devoted themselves to this branch of study. But does their modified method owe its origin to the rules established by Bernard and Antoine Laurent de Jussieu? I think it may be affirmed, that every system which may hereafter be proposed, will be founded on the fundamental principles admitted by these illustrious philosophers, and will therefore be only their method brought to perfection, rather than one entirely new.

This is what will naturally flow from the examination of the principles which have guided these celebrated botanists in their works, and from the progress made in this branch of the science since the publication of the *Genera*. But let us examine for a moment the origin of this method; the first attempts made to attain to some parts of it; and in what state this branch of botany was placed, when A. L. de Jussieu effectually introduced it into science.

The greater part of classifications preceding that of Jussieu, had for their object the distribution of vegetables in some method calculated to facilitate their determination, rather than to arrange them

in natural groups. Some eminent botanists, however, had not failed to perceive the importance of characters best calculated to divide the vegetable kingdom into a few great natural classes. Thus Ray in 1682, and Boerhaave in 1710, had recognized the importance of the characters furnished by the embryo, and adduced the distinction of monocotyledones and dicotyledones, although they often made an inaccurate application of this principle. But their classification in other respects, although preserving, like all other systems, a considerable number of natural groups, is too systematic to avoid the introduction of many which are completely artificial. All the older methods, besides, admit the separation into trees and herbs, which, for the most part, interrupts all natural relations.

Linné, who so greatly advanced the progress of botany by the precision he introduced into the science, by the simplicity of his sexual system, and by his sagacious researches into the most interesting phenomena of vegetable life, is pre-eminently entitled, from the enthusiasm of his numerous disciples, to be regarded as the head of a systematic school, although he has positively declared that he used every effort to lay the foundation of a natural method. Of this he has presented us with a sketch in his *Classes Plantarum* in 1738, and a new edition in his *Philosophia Botanica* in 1750.

He always esteemed this method preferable to every other, and considered it as the essential object of science; but it must be admitted that if he was the first in attempting to indicate some fragments (as he himself expresses it) of the natural method, these fragments were extremely imperfect in many respects; for of the sixty-seven groups he established, only the half nearly correspond to such as have been retained, while the others are united to genera pertaining to very different families.

Moreover, Linné has neither indicated the characters of these groups, nor pointed out the principles by which he was guided in forming them. It may even be supposed that he has allowed himself to be directed rather by the natural perception of affinities which a botanist of such discrimination necessarily possessed, than by a profound and comparative study of the organization of the different genera associated in each of his groups. It is easily perceived that he was guided by no fixed principle in the formation of his different natural orders, for in some of them, the *Sarmentaceæ*, for example, the dicotyledones and monocotyledones are mingled almost in equal numbers; while in other instances, this is the case with the monopetales and the polypetales, as in his *Dumosæ* and *Vepreculæ*.

To Linné succeeded Adanson and Bernard de Jussieu, who de-

voted themselves to the study of the natural method nearly at the same period.

Adanson was struck with the diversity of the systems hitherto established, and perceived that, notwithstanding the different principles on which they rested, the greater part agreed in preserving untouched certain groups which the intuitive perception of natural affinities led every one to recognize as natural groups. He therefore conceived, that, by purposely multiplying systems, and founding them on all the organs, and on every consideration which these organs could supply, the different relations existing between different vegetables would be thus rendered apparent; and that by bringing together into one family such of these genera, as were found to correspond in the greatest number of particulars in these artificial systems, we should attain to a true natural classification. Proceeding on this principle, he established sixty-five different systems, founded sometimes on characters of importance, at other times on characters of little value, and almost impossible to define. The result of this was, that by assigning nearly an equal value to these different systems, the general classification he deduced from them, instead of being more perfect than that of Linné, interrupted the natural affinities even more frequently. In fact, if we apply to them, in order to form a comparative estimate of the two methods, the principle admitted by Adanson himself in judging of the systems antecedent to his—that is to say, if we examine how many of these groups there are, which, notwithstanding the progress the study of natural families has made, continue to be admitted or correspondent to two or three families which our methods still permit to stand by the side of each other,—we will find that, of the sixty-seven Linnean families, thirty-four have undergone scarcely any alteration, while of the fifty-eight families of Adanson, twenty-six only have been able to withstand the same proof. Thus the tedious and laborious investigations of Adanson, at a period, too, when the science had made a great advance, led him to a result which is no nearer approximation to the truth than that of Linné.

It may only be remarked that Linné, aware of the imperfect knowledge which could be obtained in his time respecting the natural classification of plants, had appended to his method, under the title of *vagæ et etiamnum incertæ sedis*, a considerable series of genera either little known, or whose position appeared to him doubtful; while Adanson, in the belief that his method was infallible, attempted to classify them all, and this pretension to outstrip the knowledge of his time was perhaps the cause of many of the impro-

per alliances he has been led to form. It would be unjust, at the same time, not to acknowledge that there is to be found, in many parts of his work, the indication of affinities previously overlooked, and which he very happily perceived.

While Adanson was engaged in these complicated labours to arrive at the natural method, Bernard de Jussieu, examining nature with a sagacity which may be judged of from the few memoirs he has published, established the principles of this method, not in a book, but by nature itself, namely, in a series of plants in the garden of Trianon, or in a still more perspicuous manner, in the catalogues used in the formation of that garden; for the manuscript lists he has left, the most complete of which has been published at the head of the *Genera* of Antoine Laurent de Jussieu, indicate the position of many genera, which at that period were not cultivated in gardens.

It is sufficient to compare this simple list with the attempts at a natural method by Linné and Adanson, to see how much it is superior to both, and what a profound knowledge and sagacity it implies in this learned botanist, whom Linné was pleased to designate as one of the masters of the science. As a proof of this, upwards of two-thirds of the groups established by Bernard de Jussieu have remained untouched, notwithstanding the progress of botany, or have only been subdivided, without these subdivisions being disjoined from each other. The examination of the genera united in each of these families, as well as the series which he has established, shows that Bernard de Jussieu had assumed as a character of the first order, presenting no real exception, the structure of the embryos, acotyledon, monocotyledon and dicotyledon; for it is evident that the few instances where he has included in the same family, plants differing in this particular, result from the still imperfect knowledge which we possess of the nature and structure of fruits.

It may be seen, in like manner, that he had appreciated the importance of the characters furnished by the relative insertion of the different parts of the flower, and that he had even made this the subject of a careful examination, for he has very rarely united in the same family plants presenting any notable differences in this respect; and the order of these families, as well among the monocotyledones as among the dicotyledones, is founded on the insertion of the stamina, or of the corolla, on the pistil, the calyx, or the receptacle.

Although Bernard de Jussieu, therefore, has not made us ac-

quainted with the rules which directed him in his researches after the natural method, it cannot be doubted that he acted on two principles of this method which are still admitted as the most essential and least liable to exception, namely, that the differences in the structure of the embryo furnish characters of the first order, and the different modes in which the parts of the flower are inserted, supply characters of the second order. But when we examine the various catalogues which preceded the planting of the garden at Trianon, we perceive that it was not by one trial that he arrived at this result, and that he successively brought to perfection both the grouping of genera into families, and the distribution of these families.

Such was the state of botany, viewed in relation to the natural method, when Antoine Laurent de Jussieu, who was born at Lyons in 1748, came to Paris in 1765, to complete his medical and scientific studies, under the direction of his uncle, Bernard de Jussieu. The first years of his abode in this city were entirely devoted to these studies, and he terminated them in 1770, by a thesis for the degree of doctor in medicine. The subject of this thesis, and the mode in which it is handled, show the direction already given to his studies, and the philosophical spirit which animated him at first entering upon his scientific career. That subject was, *An economiam animalem inter et vegetalem analogia ?* and it is, in fact, a concise, elegant, and perspicuous exposition of what was positively known at that period respecting the structure and functions of vegetables, and a comparison of them with the phenomena of animal life. The manner in which this question is treated was evidently a brilliant outset for a young man of twenty-two ; and when Lemonnier, then professor of botany, became unable to attend at the Royal garden, in consequence of the duties entailed on him by his situation as first Physician to the King, Bernard de Jussieu proposed his nephew as his substitute, which was agreed to. Antoine-Laurent de Jussieu then devoted himself, with renewed ardour, to the study of that branch of science which he was thus called upon to teach.

The memoir on the family Ranunculi, which he read to the Academy of Sciences in 1773, proves how speedily he had turned his studies to some account, and how thoroughly his mind was imbued with the excellent principles, which, as above-mentioned, had evidently directed Bernard de Jussieu in his attempts at natural classification.

In this memoir, which procured for its author admission into the Academy of Sciences, and in a second memoir, presented the follow-

ing year, on the new arrangement of plants in the royal garden at Paris, we find, for the first time, the fundamental principles of the natural method explained with perspicuity and precision. We there find a just appreciation of the grand principles of subordination of characters, and their unequal value; a principle unknown to Linné and Adanson, evidently recognized by Bernard de Jussieu, but of which Laurent de Jussieu was the first to perceive the full importance, and he afterwards applied it with singular judgment.

Thus, in the first of the above-mentioned memoirs, we find this passage:

"We have seen, by some general principles developed in this memoir, the affinity which exists between the parts of fructification; in this affinity different degrees are perceptible: all these characters have not the same value, or the same efficacy in uniting or separating plants. Some are primitive, essential, and invariable, such as the number of the lobes of the embryo, its situation in the grain, the position of the calyx and of the pistil, the attachment of the corolla and stamens; these serve for the principal divisions. The others are secondary; they are sometimes variable, but never become essential, unless when their existence is connected with that of some of the preceding, and it is their assemblage which distinguishes the families."

Such, then, from the date of 1773, were the fundamental principles by which Antoine-Laurent de Jussieu was guided in drawing up the *Genera Plantarum*. They are expressed with much precision; and if he sometimes deviates from them, it may be perceived that he does so as a concession to facility of study, or to the old systems, rather than from real conviction. Thus in the memoir read in 1774 on the new arrangement in the Garden of Plants, he has evidently departed from the rigorous principle of the insertions, as Bernard de Jussieu had admitted them in the catalogues of Trianon, by dividing the dicotyledones into apetales, monopetales, and polypetales; but we have only to read his memoir to perceive, that his only object was to multiply the great classes, and to establish some relations between the new order and the method of Tournefort which it replaced, and which was generally known, not only to the pupils, but to the majority of the botanists of that era. We must not therefore lose sight of the origin of this part of Jussieu's classification when we wish to appreciate the method followed in the *Genera Plantarum*, which does not sensibly differ from it.

From this period up to 1785, Antoine-Laurent de Jussieu always arranged the plants in the botanic garden according to this method.

The lists used in his demonstrations, worn out by use, often renewed, covered with notes and additions, and at last presenting not only the list of the genera and species cultivated, but the characters of the families and most frequently those of the genera concisely and perspicuously indicated,—all shew that these eleven years were diligently employed in bringing his natural method nearer perfection. From the year 1770, Bernard de Jussieu, now 71 years of age, ceased entirely to take any charge of the garden, which he wholly entrusted to his nephew; his health, and particularly his sight, became feeble, and in 1777, after having experienced several attacks of apoplexy, he finished his long career—a career which had in reality so much influence on the progress of botany, although in appearance it had been productive of little.

A comparison of dates will suffice to show what portions of the natural method, as explained in the *Genera Plantarum* of 1789, are due to Bernard de Jussieu, and what to his nephew. The arrangement at Trianon, formed in 1759, proves that the classification of the families according to the cotyledons and the insertion of the stamens, is due to Bernard de Jussieu; Antoine-Laurent de Jussieu, while studying this series, and receiving his early botanical education from his uncle, probably drew up the first principles of the science; but every thing proves that the influence of Bernard de Jussieu on the works of his nephew is limited to this.

In fact, Bernard de Jussieu's three note-books relative to the order of the garden at Trianon, contain not a single character either of the classes, families, or genera; there is not even an indication of any of the classes except those of the Monocotyledones and Dicotyledones. In his notes on the cards we find some generic characters accompanied with sketches of the section of the seed; but these cards, carefully preserved by his family, are far from numerous.

This method of description on cards (*cartes*) was followed by his nephew; they are frequently dated, and amount to a great number in 1774.

Finally, the oldest notes used in his demonstrations by Antoine-Laurent, bear the characters of the families, which are not found in any of those belonging to Bernard.

Thus the first principles of the classification are due to Bernard de Jussieu, but the profound and sagacious application of these principles and the true institution of the natural families are to be ascribed to Laurent.

In 1785, Desfontaines succeeded Lemonnier, and A. L. de Jussieu discontinued his demonstrations as the substitute of the latter.

He immediately commenced to draw up his *Genera Plantarum secundum ordines naturales disposita*, which was nothing else than the developement of the writings used in his demonstrations, and which he had been bringing to perfection from the year 1774. The materials prepared for the work, may, in fact, be seen in a catalogue of genera, to which is added a list of all the new genera indicated in recent works, and which were to be arranged in their proper order in the *Genera* when completed.

The four years that intervened between 1785 and 1789 were thus employed in digesting the materials which were to enter into the composition of the *Genera*, and in the actual completion and printing of the work. The printing went on as the author drew it up, and yet the successive and definitive completion of the different parts led to no important error, so carefully had the general plan and the series of the genera been previously elaborated.

The fifty years which have now nearly elapsed since the publication of this work, and the numerous investigations of the natural method which have taken place since that period, allow us to regard the opinion of the learned world regarding it as the opinion of posterity, and this opinion is so general and so unanimous in its favour, that it would be fruitless to insist here upon its merit and importance. However, without presuming to form a judgment on what has been already determined by the most distinguished botanists of all countries, we may be permitted to inquire, to what kind of merit the *Genera* of Antoine Laurent de Jussieu owes the influence it has exercised, not only on the progress of botany, but likewise on that of every other branch of natural history.

Up to the time of the publication of the *Genera Plantarum*, it may be said that the natural method had not entered the field of public inquiry. The series of Linné and Bernard de Jussieu, very incomplete, and merely nominal, had no other effect than suggesting some speculative reflections to men who were in a condition to guess at their principles. The work of Adanson, destitute of general principles, and destroying natural affinities in the majority of cases, was presented besides in a form which necessarily rendered it difficult to consult, and afforded no opportunity for the author to explain the reasons which led him to form such and such relations. Thus from the date of 1763, the time when Adanson's Families of Plants were published, up to 1789—a period of twenty-six years—the natural method had made no progress in the learned world. Neither in France nor in any other country had it acquired new fol-

lowers ; merely a passing glimpse had been obtained of it ; its nature was not yet demonstrated.

The *Genera* of 1789 had, on the contrary, a speedy influence on the direction of botanical studies. This influence was not indeed immediate, for the public attention was then turned to events of high importance altogether foreign to science. But at the end of a few years the work had come almost into general use throughout France in public teaching, not only in the instructions of the faculties and the Garden of Plants at Paris, but also in the majority of the central schools, those foci of general and varied instruction which were too speedily destroyed.

Of the botanical works in ordinary use, the Flore Française of Lamarck and of Decandolle, as well as many local floras, were arranged according to this method, and made it more generally known ; and scarcely twenty years had elapsed, when an eminent botanist declared himself one of its most devoted champions, and contributed materially to bring it to perfection. Since that time it has spread over Europe, and it may be even said the whole world. Its superiority over artificial methods is generally acknowledged, and the latter are now admitted only in their proper character, namely, as more or less convenient keys for opening a way to the nomenclature of vegetables.

We may add, with Cuvier, that the influence of the *Genera Plantarum* is not confined to botany. Every branch of natural history, and zoology in particular, have derived benefit from the principles which guided Jussieu, and which he has so well explained in his admirable introduction ; and we are inclined to think that Cuvier, in expressing this opinion, founded it on his own experience, and that the principles alluded to regulated him in the changes he introduced into the zoological system. To exercise in a gradual and durable manner so positive and generally acknowledged an influence on the progress of science, a work must necessarily unite two different kinds of merit ; general ideas of a varied, important, and novel character, and as perfect an application as possible of these principles in all their details. These, in fact, are the qualities we find united in the *Genera* of Antoine-Laurent de Jussieu. The introduction, written in the most perspicuous and elegant Latin ever employed on scientific subjects, presents an exposition not only of the fundamental principles of the natural method, but as perfect a view of the structure of vegetables as the existing state of botany permitted.

The characters of the classes and families afford an opportunity

for applying and developing these principles; and the exactness, perspicuity, and precision of these characters, particularly such as apply to the families, still authorize us, if we keep in mind the period when they were framed, to consider them as models which few authors have equalled, and none surpassed.

Finally, the notes appended to the greater part of these families form, perhaps, that portion of the work which most evinces the judgment and extensive knowledge of the author.

It was in them that he often corrected the artificial tendency which a linear series always assumes, that he pointed out the multiplied relations of families to each other, and that he indicated the doubts left upon his mind by imperfect observations which he had been unable to verify, or which led to the presentiment of remote affinities, a foresight which greatly outstripped, so to speak, the actual state of the science. Many of the improvements subsequently introduced into the natural method, are in reality, foreseen or indicated either in these notes, or in the sectional divisions of the families, or by a word placed at the end of the generic character.

This last part of the work, the characters of the genera, considered by some superficial authors as a simple compilation, is not in our estimation, the least remarkable feature of it. Certainly the work would have presented, after the characters and notes on the families, a list of the genera comprised in each of these families, as every one has since done who has followed in the same track, and this of itself would have rendered an immense service to the science, and sufficed to elucidate the natural method. Yet, without generic characters, a table of the families would have only been a subject for study and reflection, and would not have been adapted to actual use, nor formed a manual, so to speak, for the botanist; and the natural method would have been disseminated much more slowly among the learned.

But in introducing generic characters, it may be asserted that they could not in general be taken by compilation, even from the most esteemed works of the period; for characters simply distinctive, suitable for an artificial system, would often be quite unadapted to a natural method; or a character which might appear trivial to the author of the former, might acquire great importance in the eyes of him who studies natural relations. Accordingly, the characters of the *Genera* have been generally traced by the hand of Jussieu, either after nature, or after the published or manuscript descriptions of botanists in whom he could place confidence, and the

mention of the sources from which he has derived them, always enables us to judge of their value.

If the characters of the genera, then, are partly a work of compilation, it is a kind of compilation which is indispensable in a production of this nature, and often requires more talent and discernment than direct observations.

It may therefore be affirmed that the *Genera Plantarum*, published in 1789, was a work as perfect in its execution as the state of botany admitted of, and this execution is entirely due to Antoine-Laurent de Jussieu.

With regard to the principles of the classification, the fundamental basis of the method, they were the same as those explained by the author in his memoir on the series of plants in the garden of Paris; that is to say, the same as those admitted by Bernard de Jussieu, and deduced from the number of the cotyledons, and the relative insertion of the parts of the flower, to which were added such as are derived from the presence and structure of the corolla.

The adoption of these characters, as the base of the first classification of the dicotyledones, has perhaps contributed to interrupt the relations which Jussieu no doubt perceived to exist between the apetales and the polypetales, and in some rarer instances between the monopetales and these two last classes. But it is necessary only to refer to the memoir above-mentioned, to perceive that the desire of multiplying the number of the classes, to render the natural method of more easy use, determined the author, in this instance, to depart from what he considered the rigorous principles of his method. If any blame attaches to the author of the *Genera* relatively to the classification he has adopted, it arises, I conceive, from his having made this concession for the purpose of rendering his work of easier application; for it is probable that the characters furnished by the corolla will one day be dispensed with, to a greater or less extent; and this, to appearance, will be the most important modification which the method of the *Genera Plantarum* shall have undergone, although in reality it will merely consist in reverting to the original principles of the author.

The public events which almost immediately succeeded the publication of the *Genera Plantarum*, necessarily diverted the author's attention from his botanical studies. The period which elapsed between 1789 and 1800, was but little adapted to the peaceable study of natural history: Jussieu employed it in rendering himself useful both to his own species and to science, by lending his aid in improving the hospitals, and in organizing the museum of natural history.

In 1790, he was nominated by his section member of the municipality of Paris, and was entrusted, under that title, with the management of the city hospitals: he fulfilled these duties till the year 1792.

In 1793, the garden of plants, or King's garden, was remodelled under the name of the museum of natural history. All the persons appointed, under different titles, to teach or take charge of the collections were raised to the rank of professors, and entrusted with the management of the establishment. M. de Jussieu who, like Vaillant and Bernard de Jussieu, had hitherto been merely a demonstrator, was appointed, with the title of professor of rural botany, to teach that science in the country. He thus shared the task of teaching botany with his colleague Desfontaines; and his herborisations, attended by a crowd of young students, and distinguished amateurs, contributed to spread a taste for the study, and to diffuse the enlightened principles which he had introduced into the science; and his followers were predisposed to give a favourable reception to the latter, when they witnessed the simplicity and kindness of him who demonstrated them.

Having been chosen successively by his colleagues to be director and treasurer in the administration of the museum, he rendered important services to the establishment in these capacities, particularly at the difficult period of its reorganization, when, notwithstanding the obstacles which political events often opposed to the prosperity and even the existence of the museum, he found means, by his zeal and activity, to perform services of the highest advantage to it.

He resumed the publication of his botanical researches when the Annales du Museum were commenced in 1802.

Besides a series of notices on the history of the Museum of natural history, we find in the early volumes of this collection many memoirs on new or imperfectly described genera; or on families which recent discoveries or more exact observations have enriched with new genera. Thus the Amaranthæ, the Nyctagineæ, and the Onagrariæ were successively submitted to a new examination.

It may be perceived that his object in these investigations was to bring the *Genera Plantarum* and the natural method nearer perfection; but this purpose became more evident in the fifth volume of the collection, in 1804, when he began to publish a series of memoirs devoted to the examination of the general characters of the families derived from the fruit, and confirmed or rectified by the observations of Gærtner. He mentions at the same time the additions which these families had received since the appearance of the *Genera*, and discusses questionable points of organization or synony-

my, always displaying remarkable skill in the examination of obscure genera, often ill described by their authors, and whose structure he refers to their true type with singular discrimination, as appears from his decisions having been almost invariably confirmed by more recent observations.

This revision forms the subject of fifteen memoirs, published between the years 1804 and 1819, and embraces all the families of the apetalous, and monopetalous dicotyledones, as well as the epigynous, and hypogynous polypetales.

Always desirous to complete the view of the vegetable kingdom presented in his *Genera Plantarum*, and to make that work keep pace with new discoveries and the progress of science, Jussieu published successively other memoirs, in which he established new genera, occasioned either by his having become better acquainted with their structure since the publication of his original work, or by the numerous discoveries resulting from recent scientific travels, which had introduced into collections so many forms either wholly new, or associating with genera hitherto insulated, and which he had not therefore ventured to consider as the types of particular families. It was thus that the author of the *Genera*, by being the first to add to the edifice he had himself reared, showed that he considered it susceptible of modifications and improvements; for, like every one of an elevated mind, he was aware that the sciences are never stationary, and admitted that the natural method must become more perfect in proportion as botany becomes more extended.

In this way he added to the families already established in 1789, those of the Loaseæ, the Passifloreæ, the Monimieæ, the Lobeliaceæ, the Polygaleæ, and the Paronychieæ. Finally, many of these memoirs are occupied with the examination of obscure genera, whose relations to known genera and natural families could be with difficulty established; of this description are the memoirs on the Phelipæa of Thunberg, the Hydropityon of Gærtner, many genera of the Laurineæ which ought to be united into one, and on different genera of Loureiro. Perhaps there are few memoirs of great extent which evince more strikingly than these short notices, the extensive knowledge and discrimination of Jussieu: we perceive at every instant how the appreciation of characters, their value, their subordination, or their incongruity, proved a safe guide to him in this difficult investigation. We there see disclosed, so to speak, the method he followed in ascertaining the alliances of numerous exotic genera, often very imperfectly known, and which he has almost always succeeded in classing correctly in his immortal work.

The last memoir published by Jussieu appeared in 1820, in the sixteenth volume of the Memoirs of the Museum. It related to the family of the Rubiaceæ, and presented all the genera arranged and described, after the manner the author intended to follow in a new edition of the *Genera Plantarum*, which he then projected, and for which he had constantly been employed in providing materials. This last work, published when he was seventy-two years of age, is worthy of its predecessor of 1789: we find in it the same arrangement, the same distinctness of ideas, the same simple and precise definitions.

From this period Jussieu's sight became so weak that he was obliged to relinquish the examination of nature, and confine himself to studying the works of others. His only contributions to science are some articles inserted in the Dictionary of Natural Sciences, relating either to the families of plants, or such as are mentioned by travellers under their vulgar names, which he endeavours to refer to their proper genus or family. These consisted of materials collected long before, and we still recognize in them a mind which joined a most extensive erudition to an intimate knowledge of nature.

We ought also to mention the article on the natural method, in the same collection, published in 1824, in which the same skilful hand has given, with his usual perspicuity, the history of the natural method in botany, and explained the principles on which it is founded.

Finally, in the last years of his life, from the date of 1826, his duties relative to the Museum of Natural History having been undertaken by a son worthy of such a father, he passed a great part of the year in the country, and divided his time between the reading of the most modern books on botany, and drawing up an analysis of such of his works as appeared to him of most utility to science.

Combining these recent discoveries with the knowledge he had acquired in the course of his long career, he made them the subject of a new edition of the introduction to his *Genera Plantarum*.

In this *proemium*, which is written in the same pure and elegant Latin as the first Introduction, we find some of the same ideas as he advanced in 1789, particularly those on classification: but it at once appears that he was a stranger to none of the modern discoveries in anatomy and physiology, for he conceived that they all should concur in perfecting the natural method, the base of which should be formed by all the parts of the organization of vegetables. He was engaged almost to the close of his life in completing this work, which turned his attention to his past studies, and agreeably occupied his mind. But his sight had by this time become so weak that it could no longer direct his hand, and he was often obliged to employ the

pen of another ; but this impediment did not make him discontinue his exertions.

We conceive that this, the last work of so illustrious a man, written when he was about 83 years of age, and yet worthy of the author's best days, will be read with interest by those who may have a desire to compare it with the introduction to the *Genera* of 1789. It is besides an homage which ought to be rendered to the memory of an individual who has contributed much to the fame of our country, to lay it before the public ; and we are happy to have it in our power to add it to the present notice.*

If the labours of M. de Jussieu entitle him to a place in the first rank of savans, he may in addition be held up as a model for amenity of character. He was full of kindness to those who devoted themselves to the study of the sciences, and gave every encouragement to such as distinguished themselves in the pursuit. Entirely devoted to the advancement of botany, and searching only for truth, he candidly acknowledged his own errors, and pointed out those of others without asperity. He was never drawn into the polemics of science : no example can be cited, either in his work or in his numerous memoirs, of a single word calculated to injure any of his contemporaries, and yet he was the means of advancing the science much more than those who have combated in support of their views. His were founded on truth, and needed no adventitious support ; left to themselves they have gradually wrought their way into science, till they are now generally admitted. He had the happiness, therefore, to join to the distinction he acquired by his scientific superiority, the friendship of all who were able to appreciate him ; and the young, to whom he was remarkably kind, entertained a most filial veneration for him.

Surrounded by the marks of esteem and friendship, entirely devoted to the study of the sciences, and never extending his ambition beyond this circle ;—happy in the bosom of a numerous family, and seeing himself survive, so to speak, in a son worthy to bear his name, and who had become even during his lifetime his colleague and successor,—he passed his long career in the enjoyment of a happiness which he owed as much to himself as to the circumstances in which he happened to be placed ; and at last, in the eighty-eighth year of his age, on the 15th September 1836, a short and not very painful disorder brought to an easy termination a life which had been spent in so much usefulness and tranquillity.

* It will appear in the same volume of the Annales des Sciences Naturelles from which the above biographical notice has been extracted.

II.—*Notes on the Ornithology of Norway.* By W. C. Hewitson, Esq.

Having long wished to explore the breeding places of those birds (periodical visitants of our shores) which leave us during the time of incubation, Norway was fixed upon as the country which we supposed most likely to gratify our hopes; and, could we have placed dependence on ornithological works, they would not have been disappointed. It seems however to have been, (as I fear it is still,) the custom with ornithologists to refer the breeding-places of those birds about which they know nothing either to Norway or some other northern country. Relying too much upon them, we had promised ourselves a long list of acquisitions, comprising nearly all the rarer British birds. On the other hand, all the books of travels in that country which we consulted agree in describing the scarcity of birds in the Norwegian forests.

Never was a country in appearance more fitted as the resort of every class of birds,—with its extensive fiords,*—its numerous lakes and rivers,—its unbounded forests,—its mountains and marshes,—its lofty precipices,—and its unnumbered islands.

For weeks we explored those ceaseless forests, over paths at one time the track of a mountain torrent, at another the margin of a lake or river, penetrating wilds untrodden except by the bear hunters, climbing in turn the tops of the snowy mountains, but with so little success that we ceased to carry our guns,—almost the only living creatures which we saw being the hosts of black ants with which the woods swarm, and by the tracks of which (as clearly defined as the footpath in our fields) they are everywhere intersected.

The fieldfare was the only bird which we ever saw in abundance in the forest; a thrush, a chaffinch, or a yellow-hammer, would sometimes, though rarely, cross our way.

Four-legged animals were alike rare; no bear or wolf ever appeared to peril our path, and the total number of quadrupeds seen during our rambles consisted of three foxes, a hare, a few squirrels, a rat, and a mouse.

With little better success we visited upwards of a hundred islands, and though they were each of them occupied by a few of the black-backed, heron, or common gulls, we never saw these, or any of the sea birds, (with the exception of the puffin, eider duck, and common gull,) in the same abundance that they are seen at the breeding places upon our own coasts.

* Arms of the sea.

Anxious to arrive in Norway at the first breaking up of winter, we proposed to make the fieldfare our guide, and to take our departure about the same time; it was not, therefore, without feelings of uneasiness that we watched its protracted stay upon our shores long after the blackbird and the thrush had been busied in incubation. May had commenced, and yet the fieldfare tarried, and on the 6th we sailed, and on our passage out were overtaken by several small birds, which, after resting a few minutes on our rigging, shot rapidly ahead of us. The solan goose was observed during the whole time, and at the greatest distance from land.

The weather on our arrival was bitter in the extreme, the day following was sunny and delightful, and in a few minutes walk from Drontheim we found ourselves on the borders of the forest, surrounded by the delicious notes of several of our own sweet songsters.

With the exception of a few eagles, birds of prey were scarcely ever seen; once or twice only we observed a species of buzzard, a harrier, and the hobby, while the kestrel and merlin were seen but a few times.

Both the British eagles were, however, not unfrequent upon the coast, the white-tailed the more common of the two. Few of the large rocky islands were without them, to particular spots of which they seem to form an attachment,—daily taking their stand for hours together upon some points of rock to prune their feathers, or to sit in motionless inactivity.

Mr John Hancock, who was one of our party, succeeded at midnight in watching a white-tailed eagle to its eyrie, which was upon a ledge projecting from the side of a perpendicular precipice, and inaccessible. With much difficulty Mr B. Johnson and myself succeeded in gaining a position above. In doing so we had climbed up a deep ravine, and had passed so near the nest, displacing fragments of the rock at every step, that we had given up all hopes of surprising the old bird; and having laid down our guns beside us when the old bird left the nest, which had been hidden by a bush, and was not many yards below us, we were then holding on by one hand to tufts of grass to prevent our sliding down the oblique surface of the rock, and it was to no purpose that we discharged our guns with the other. We could now discern an egg and a newly hatched young one.

Whilst one day wandering in the forest, we were attracted by the anxiety evinced during our loitering in the neighbourhood by a pair of merlins; and although at home we only know them as breed-

ers on the ground upon the heaths of the north, we felt assured that their nest must be in one of the trees, although we failed in our endeavours to find it. Of this I have now no doubt, since I find by reference to Temminck that they breed in trees.

Upon mentioning our surprise at the scarcity of the larger hawks, we were told that they were now breeding far in the country, remote from human dwelling places, and approachable only by several days journey over snow, and that they are seen only in the winter, or accompanied by the great eagle owl, following and feasting upon the amazing troops of the marmot, the periodical processions of which are so wonderful :—all the information we could learn respecting them was, that they commonly come in the autumn, and that the ground for a great space is completely covered with them.

Of the owls we only saw two alive, the great eagle-owl and the short-eared owl. Dead and nailed against the houses during the previous winter, we had frequently the mortification of seeing the former.

The raven is in plenty upon the larger islands, and surprised us by its tameness, contrasting with most other birds of the country, and with its habits of extreme caution in our own.

The hooded-crow is also abundant by the sea coast, in the rocks of which it breeds. One nest which we found was in the cliffs of a small island covered with sea gulls, in the very camp of its enemies, which unceasingly torment and harass it.

The magpie is one of the most abundant. as well as most interesting, of the Norwegian birds,—noted for its sly cunning habits here, its altered demeanour there is the more remarkable. It is upon the most familiar terms with the inhabitants, picking close about their doors, and sometimes walking inside their houses. It abounds in the town of Drontheim, making its nest upon the churches and warehouses. We saw as many as a dozen of them at one time seated upon the gravestones in the church-yard. Few farm-houses are without several of them breeding under the eaves, their nests supported by the spout. In some trees close to houses, their nests were several feet in depth, the accumulation of years of undisturbed and quiet possession.

The inhabitants of Norway pleased us very much by the kind feeling which they seemed to entertain towards them, as well as to most species of birds, often expressing a hope that we would not shoot many. Holes are cut in many of their buildings for the admission of the starlings, and pieces of wood are nailed against them to support the nest of the house martin. At Christmas, that the

birds may share their festivities and enjoyments, they place a sheaf of corn at the end of their houses.

The jay occurred once or twice.

The starling (next to the fieldfare) is the most abundant bird in the country, breeding in almost every house.

Of the thrushes, the fieldfare is very common, although rather local, not generally dispersed through the forests, but occupying particular parts of them, to which it seems to return year after year, —nests of previous years being mixed amongst those of the present. In these localities it abounds, breeding in society. The nests (a hundred of which might be found in a very limited distance) are placed in the spruce fir, at distances from the ground varying from four to forty feet or upwards. They as well as the eggs very much resemble those of the blackbird ; the latter were often five, and not unfrequently six in number. Their hurried flight from tree to tree, and their loud harsh cries, very soon point out their locality. Mr Swainson, in an article on the nests of birds in Lardner's Cyclopædia, in order to support a rule laid down by him, that all insectivorous birds are solitary builders, states that the fieldfares are never known to breed together. In this statement, as I have shown above, he is quite mistaken. How does he reconcile the habits of the house and sand martins to this rule? They (especially the latter) are not solitary builders.

The redwing was but seldom seen, and then perched upon the summit of one of the highest trees, pouring forth its delightfully wild note. It was always very shy, and upon seeing our approach would drop suddenly from its height, and disappear amongst the underwood. Its nest, which we twice found with young ones, (although our unceasing endeavours to obtain its eggs were fruitless,) was similar to that of the fieldfare, but nearer the ground.

The redwing is called the nightingale of Norway, and well it deserves the name.

The song thrush and the blackbird were occasionally seen. The ring ouzel often, frequenting many of the wooded rocks, and enlivening the most bleak and desolate islands with its sweet song. It shares with the redwing the name of nightingale, and often delighted us in our midnight visits amongst the islands.

The water ouzel was noticed a few times.

Of the swallow tribe, the swift and the swallow were seldom seen. The house martin was in the greatest numbers, breeding in the lofty rocks, through which the celebrated archway at Forghattan passes. The sand martin was breeding unmolested in the walls of

the town of Drontheim, at an elevation of two or three feet only from the ground. The house martin was the only species which was observed beyond 65° north.

Of the flycatchers we saw both the British species, though seldom.

The whiterump and the whinchat were amongst the most numerous of the small birds in those limited parts which are clear of wood.

We noticed also the redbreast, the redstart, and the blue-throated warbler, the sedge warbler, the blackcap, the white-throat, the chiff chaff, and the willow wren, the latter upon the islands, as far north as the Arctic Circle, from the coppices of which we were sometimes delighted by its soft sweet song. The golden crested-wren, the greater, blue, marsh, cole, and long-tailed titmice. Of the wagtails, the pied and neglected. Of the larks, the skylark, and of the pipits, the meadow, rock, and tree species.

Of the buntings, the yellow, black-headed, and snow buntings. The latter was in its beautiful summer plumage, of black and white. We found a single nest with young under some loose stones.

The house sparrow was very local, and confined to a few farm-houses at a distance from each other.

The chaffinch we saw throughout the whole of the inland district which we traversed. The mountain finch at one place only, where it was breeding. The siskin, the lesser redpole, and the green linnet seldom. The crossbill would now and then cross our road through the forest, but in such rapid flight, that it required great exertion to keep pace with them as they passed from tree to tree, examining the cones of the pines. Of the parrot crossbill we obtained two specimens.

Of the green woodpecker, we saw several near one of the churches, in the steeple of which (being of wood) they had bored several holes in which to deposit their eggs. In two instances only the great black woodpecker was seen at a distance, but so wild, that it was impossible to approach it.

The welcome sound of the cuckoo was seldom heard.

The periodical visits of the grouse (Tetraonidæ) to this country are very interesting. In one year the ptarmigan, which comprises two species, (Tetrao lagopus and saliceti,) and the black grouse (T. tetrix) abound in amazing numbers, breed around the houses of the natives, and are extremely tame. The next year probably they are scarcely to be met with, The season we were there was unfortunately the year of scarcity ; and although we took infinite pains, and used every exertion to obtain the ptarmigan, it was

of no avail. Whether or not this part of Norway is supplied with birds emigrating from Russia or other parts of the continent, or by more partial emigration from its own mountains, during the severe months of winter, I will not pretend to say. The previous winter had been such for extreme mildness as was not remembered, so little snow having fallen that the sledges were useless, and the communication from the inland country cut off.

The capercailzie we had only twice the satisfaction of seeing alive in the woods; on the hospitable board of the merchants of Drontheim more frequently. They are scarce and very difficult to procure, and are only obtained by the natives with the greatest perseverance, being nearly always shot with the rifle, and either during the night or at the break of day: it is considered in consequence a very good night's work to bring down one. They breed in the mountainous parts of the forest far from any habitations, and it was with the greatest difficulty we could procure the eggs. They are very similar to those of our black grouse, but larger. The other species of game are the black grouse; the British ptarmigan (T. lagopus,) ought scarcely to be included in a list which is intended to contain those birds only which we ourselves saw, not having met with a single specimen, although extremely abundant in some seasons. Of the willow grouse (T. saliceti) we shot a pair upon one of the larger islands; they were remarkably tame, and could not be urged to take flight.

The note of the corncrake was once or twice heard.

The golden plover and the dotterel were in small flocks upon the patches of cultivated land. The ring-dotterel often upon the sea shore, the colouring of a specimen which we shot appeared to us unusually bright and beautiful; indeed, we observed this with regard to several of the birds which we shot while there. Of the waders, we noticed occasionally, the curlew, the whimbrel, the greenshank, redshank, ruff, dunlin and purple sandpiper. We were much amused with what was to us quite new, with regard to some of the birds just mentioned. One day we were pursuing a bird of this class, and after hunting a marshy place towards which it had flown to no purpose, we discovered it, much to our astonishment, seated above our heads on the top of a tall tree. We found afterwards that it was a common practice with the redshank and the greenshank, and what surprised us more, the long legged curlew would frequently alight on the top of the pine forest, and would pass from tree to tree uttering its loud note.

The oyster catcher was frequent everywhere. Numbers of them

were apparently idlers, and flying together in flocks during the whole summer.

We were rewarded for many a toilsome search by finding the nest and eggs of the turnstone. They were admirably sheltered from the many storms to which the bleak islands where they breed are exposed, being placed beneath the branches of the juniper bushes, which creep closely along the surface of the rocks. We afterwards found several of their nests; and it was an easy matter for us to ascertain (before landing) upon which island we should be successful in discovering another of their nests, by the daring attacks they made upon any of the larger gulls which approached them.

The coot was only once seen.

The bean goose was rather numerous upon one of the huge islands near the Arctic Circle, where it had been breeding during the previous month.

Of the ducks we noticed the velvet duck, scoter, common wild duck, teal, widgeon, shieldrake, long-tailed duck, golden eye, and eider duck. The last mentioned by far the most numerous, breeding in great numbers upon some of the islands; the male birds, which were floating around them in hundreds, together giving the sea a lively and most beautiful appearance. They are a valuable property to the natives, and are in consequence strictly protected by them. Upon one island which we visited in company with the keeper, the females were sitting in great numbers, and were so perfectly tame, and on such familiar terms with him, that they did not appear to be in the least disturbed whilst we stood by to look at them, and some of them would even allow him to stroke them on the back with his hand.

Of the golden-eye we had the satisfaction to find a nest, and, for a bird of its habits, most singularly situated. It was in a tree, in a hole lately occupied by the great black woodpecker, at the height of ten or twelve feet from the ground, and so small that it was with difficulty we could insert the hand.

Of the goosander we frequently observed small flocks, almost entirely male birds, accompanied rarely by one or two females. The females must have been breeding somewhere in the neighbourhood, but it was in vain that we made every search for the eggs. Upon inquiry of the best informed people, we were told that the females are never seen during the summer, nor until (accompanied by their young ones) they join the male birds in the autumn.

The red-breasted merganser was frequent upon most of the lakes

and rivers, laying its eggs under the shelter of the spruce fir tree, either upon their margins or their numerous woody islands.

The great northern and black-throated divers were seen, though rarely, in the fiords ; the red-throated diver often upon almost every piece of water. We frequently heard their loud singular scream in an evening at a great distance.

The pretty black guillemot gave an interest to almost every island where crevices in the rocks or loose stones were to be found as breeding places.

Amongst the numerous islands which we visited it is a singular fact that we never once saw either the common guillemot, the razor-bill, or the kittiwake,—all birds the most frequent upon our own coast. This was owing, no doubt, to the scarcity of those rocks which, rising perpendicularly from the water's edge, afford them the necessary security.

The puffin was alike rare, except upon one island, where they abounded in incredible numbers. The island rose in its centre to the height of several hundred feet, one side being composed entirely of rocks and large stones, piled upon each other in the wildest confusion, and under these the puffin was breeding, and so numerous were they, that we could distinctly see them the evening before, from the hut in which we took up our night's residence, although at the distance of upwards of a mile. Whilst scrambling over the rocks, we could hear them beneath us uttering a most singular groaning kind of sound. They would frequently start from under our feet, and join the dense throng which was unceasingly passing around us. It was a sight which astonished at the same time that it delighted us. I had never before seen so many kinds of one species together, and probably their numbers are scarcely exceeded by the combined numbers of guillemots and gulls which frequent one of the largest breeding places upon our coast. We seated ourselves upon the rocks to enjoy the scene, and numbers of them settled near us, forming themselves into the most beautiful groups ; every rock or large stone was covered with them, and hundreds were at the same time within the range of our guns ; some were seated low upon the whole of the foot, others erect upon the toes only ; some struck out their crops, and strutted about exactly in the manner of pigeons.

Of the terns, the arctic was the only species we noticed.

Of the gulls, the greater and lesser black-backed, the heron, and the common gull were numerous, the latter especially upon one island, the owner of which had laid up a store of their eggs for win-

ter's consumption, consisting of about 2000, from which we had the pleasure of selecting specimens for our cabinets.

Some of the arctic gulls (Lestris) passed over us, apparently on their way further north. The Lestris Richardsonii was abundant, one or two pairs breeding upon almost every island. Birds in the different states of plumage being indiscriminately associated together, the many nests which we found were in turns the property either of two white-breasted birds, of two entirely of a uniform dark colour, or of a pair consisting of one of each.

III.—*The British Cerastia: a Supplement to a former Essay.* By C. C. Babington, F. L. S., &c. Plate IX. Continued from p. 204.

Cerastium Atrovirens.—Leaves broadly ovate, petals much shorter than the calyx, sepals lanceolate-acute covered with glandular hairs their apex and margins narrowly membranous, bracteæ herbaceous, capsule obovate or subcylindrical shorter than the calyx, fruit-bearing peduncles two or three times as long as the calyx and erect.

The whole plant of a dark-green colour, and covered with short very viscid pubescence. Root small, fibrous. Stems numerous, ascending repeatedly forked, bearing a flower in each fork. Leaves very broadly ovate, somewhat pointed, the lower ones narrowed into a broad petiole, the others sessile. Flowers scattered, one in the axil of each fork of the stem, all their parts arranged in fours. Peduncles two or three times as long as the calyx, always straight and erect. Bracteæ totally without any membranous margin. Sepals lanceolate, acute, covered with short glandular hairs, with narrow membranous margins and apex. Petals about half the length of the calyx. Capsule almost always opening with eight teeth in conformity with the quaternary structure of the flower; in one instance I observed ten teeth remarkably short, never as long as the calyx, and usually about half its length, obovate, or subcylindrical, inflated below, and slightly curved towards the top, always erect, and never forming an angle with its peduncle. Seeds rather large, chestnut-brown, compressed and tuberculated.

Gathered by Dr G. Johnston on old walls in the immediate vicinity of Berwick-upon-Tweed, flowering in May and June.

This plant is very nearly allied to *C. tetrandrum*, from which it differs by not having an herbaceous line extending to the apex of the sepals, its very short capsules, erect, that is, not reflexed fruit, and the total want of a membranous margin to the bracteæ. It is

distinguished from *C. pumilum* by the same characters, (the membranous apex of the sepals excepted,) in addition by the shortness of its petals, its dispersed flowers, and long peduncles. From *C. pedunculatum*, with which it agrees in its dispersed flowers and glutinous pubescence, it may be distinguished by its difference of habit, much larger and nearly orbicular foliage, shorter internodes, total want of a membranous margin to the bracteæ, and short capsules.

N. B. This species ought to have followed *C. tetrandrum*, described in my former paper on the *Cerastia*, p. 201, Vol. ii.

Plate IX. Fig. 1, C. atrovirens, natural size; the figure drawn from a dried specimen. Fig. 2, A leaf from a fresh specimen. Fig. 3, The flower. Fig. 4, The capsule and styles from a new blown flower. Fig. 5, The capsule open and full of ripened seeds. Fig. 6, The same, but older. Fig. 7, A seed. Fig. 8, A petal. These figures are all magnified more or less.

C. Pumilum, *Curt.*—Leaves ovate-lanceolate, petals about as long as the calyx, sepals lanceolate acute their apex and margins narrowly membranous, bracteæ herbaceous with a very narrow membranous margin, capsule cylindrical slightly curved upwards and longer than the calyx, fruit-bearing peduncles reflexed and scarcely longer than the calyx.

C. pumilum, *Curt. Fl. Lond.* ii. t. 92. *Reichen. Fl. excurs.* 4969.

C. semidecandrum, *β. Smith, Eng. Fl.* ii. 331.

The whole plant covered, in my specimens, with short viscid pubescence. Stems prostrate and ascending, branching at the root, but nearly simple afterwards. Leaves ovate-lanceolate, small, the lower ones narrowed into a broad petiole, the others sessile. Flowers aggregated into small terminal dichotomous corymbs. Peduncles very short, when bearing fruit reflexed, and scarcely exceeding the length of the calyx. Bracteæ with a very slight membranous margin. Sepals lanceolate-acute, with narrow membranous margins and apices. Petals nearly as long as the calyx. Capsule usually much longer than the calyx, but only slightly so in some few cases, cylindrical and slightly curved upwards, reflexed together with its peduncle. Seeds tuberculated.

Near Croydon. Mr Dickson.

Having recently obtained, through the kindness of the Rev. T. Gisborne, some authentic specimens of the *C. pumilum* of Curtis, which were given to him by Mr Dickson, its original discoverer, I have been able to determine this little known plant. In general

appearance it closely resembles *C. semidecandrum*, but is at once distinguished by its very slightly membranous bracteæ and reflexed fruit. It is probably *C. semidecandrum* of Loiseleur, Fl. Gall. i. 323.

IV.—*The Natural History of British Zoophytes.* By George Johnston, M. D., Fellow of the Royal College of Surgeons of Edinburgh. (Continued from Vol. i. p. 447.)

Class—ZOOPHYTA, Solander.

(Polypes, *Cuvier.*—Polypi, *Lamarck.*—Z. polypifera, *Grant.*)

Order I. Hydroida.

Character.—*Polypes compound, rarely single and naked, the mouth encircled with roughish filiform tentacula; stomach without proper parietes; intestine* 0; *anus* 0; *reproductive gemmules pullulating from the body and naked, or contained in external vesicles.* ——*Polypidoms horny, fistular, more or less phytoidal, fixed, external.*

"As for your pretty little seed-cups or vases, they are a sweet confirmation of the pleasure Nature seems to take in superadding an elegance of form to most of her works, wherever you find them. How poor and bungling are all the imitations of art! When I have the pleasure of seeing you next, we will sit down, nay kneel down if you will, and admire these things."* Thus did Hogarth—our great moral painter—write to Ellis in evident reference to the zoophytes of the present order; and he must indeed be more than ordinarily dull and insensate who can examine them without catching some of the enthusiasm of the artist. They excell all other zoophytical productions in delicacy and the graceful arrangement of their forms, some borrowing the character of the prettiest marine plants, others assuming the semblance of the ostrich-plume, while the variety and elegance exhibited in the figures and sculpture of their miniature cups and chalices is only limited by the number of their species.

The Hydroida vary from a few lines to upwards of a foot in height. They are all, with the exception of the hydra or fresh-water polype, marine productions, and are found attached to rocks, shells, sea-weed, other corallines, and to various shell-fish. Many of them appear to be indiscriminate in their choice of the object, but others again make a decided preference. Thus Thuiaria thuja prefers the valves of old shells, Thoa helecina is more partial to the larger univalves, Antennu-

* Lin. Corresp. Vol. ii. p. 44.

laria antennina, grows on rocks, Campanularia geniculata delights to cover the broad frond of the tangle with a fairy forest peopled with its myriads of busy polypes, while the Sertularia pumila rather loves the more common and coarser wracks. The choice may in part be dependent on their habits, for such as are destined to live in shallow water, or on a shore exposed by the reflux of every tide, are in general vegetable parasites; while the species which spring up in the deep seas must select between rocks, corallines or shells, the depths at which they are found being too great for the vegetation of sea-weed.*

The polypidoms are confervoid and more or less divided, the ramifications being disposed in a variety of elegant plant-like forms. The stem and branches are alike in texture, slender, horny, fistular,

* Lamouroux says,—"We find some polypidoms placed always on the southern slopes of rocks and never on that towards the east, west, or north. Others, on the contrary, grow only on these exposures, and never on the south. Sometimes their position is varied according to latitude, and the shores inclined towards the south, in temperate or cold countries, produce the same species as the northern exposures in equatorial regions: in general their branches appear directed towards the main sea."—Corall. Flex. Introd. p. L.

and almost always jointed at short and regular intervals, the joint being a mere break in the continuity of the sheath without any character of a proper hinge, and evidently formed by regular periodical interruptions in the growth of the polypidoms. Along their sides, or at the extremities, we find the denticles or cup-like cells of the polypes arranged in a determinate order, either sessile or elevated on a stalk, (Fig. *a.*) Though of the same substance, the cell is something more than a simple expansion of the stem or branch, for near its base there is a distinct partition or diaphragm on which the body of the polype rests, with a plain or tubulous perforation in the centre through which the connection between the individual polype and the common medullary pulp is retained, (Fig. *b.*) * Besides the cells there are found, at certain seasons, a larger sort of vesicles, readily distinguished from the others by their size and the irregularity of their distribution.— The more robust tribes grow erect, and, being flexible and elastic, yield readily to the waves and currents; but some of the very delicate species avoid a shock for which they are unequal by creeping along the surface.

The polypidoms, when dried, are for the most part of a yellowish or horn colour. "When they are immersed in water, they recover the same form they appeared in when fresh in the sea; and soon become filled with the liquid. This gives them a semitransparent amber colour, and makes them very elastic." † Their material appears to be analogous to horn or condensed albumen, which is moulded into a homogeneous investing sheath, in which no vessels or cells indicating a definite organization can be detected.‡ It seems to be in fact a sort of hardened epidermis, at first in contact and partial adhesion with the living interior pulp, from which it is subsequently detached, in the natural progress of its consolidation, by a process of shrivelling in the soft matter, and by the motions and efforts of the polypes themselves. §

The polypes are placed in the cells within which, with the exception of the Tubulariæ, they can hide themselves entirely when danger threatens. When at rest and in their native sites, they expand their tentacula and push them far beyond the rim of their cups, in readiness to arrest any small worm or crustaceous insect which may float within their circle. These tentacula are always simple but roughish, (Fig. *c,*) and in the centre of the disk round which they are arrang-

* Lister, in Phil. Trans. 1834, p. 371. † Ellis, English Corallines, p. 3.

‡ The contrary is maintained by Link, and it appears by Cavolini and Schweigger, who assert that they have seen vessels ramified in the stems and branches of Sertulariadæ.—Ann. des. Sc. Nat. Part. Bot. V. ii. p. 321.

§ See Lister's Observations in Phil. Trans. 1834, p. 374.

ed we perceive the oral aperture *(d,)* leading to a stomachical cavity without intestine or other chylopoetick viscus. The body is somewhat globular, soft and irritable; and it is prolonged posteriorly down the stalk or tube to be united with the central pulp which fills the branches and stem, *(e.)* so that in this manner all the polypes of the same polypidom are connected together by a living thread, and constitute a family whose objects and interests are identical, and whose workings are all regulated by one harmonious instinct:

> "Unconscious, not unworthy, instruments,
> By which a hand invisible was rearing
> A new creation in the secret deep."

Or if, with Linnæus and Cuvier, we suppose that the polypes of every polypidom constitute only one body or individual, this may be described as a sort of hydra divided, after the manner of a tree, into many or innumerable branches, from each of which pullulate one or more armed heads to capture and digest the prey that is to serve for the nutriment of their common trunk.

The reproductive gemmules of Tubularia and Coryne are generated in the interior and extruded near the base of the tentacula; but in all the other genera they are produced in external vesicles, which were therefore appropriately named by Ellis the ovaries, and which we have already mentioned as being larger than the cells and irregular in their distribution. They are produced at certain seasons only, most commonly in spring, and fall off after the maturity and discharge of their contents.* The number of the gemmules in each vesicle, and their shape, varies in every species. In the vesicle they are connected to a central placentular column, though there are some exceptions to this, and when mature they escape outwards by a disruption or fall of the lid which closes the top, being extruded in succession and, in some cases at least, after intervals of some hours. From the observations of Professor Grant, it appears to be proved that, after their discharge, the ova move about for some time in the water by the vibrations of minute cilia, but having in due course settled on a proper site, they throw out, in the manner of a vegetable seed, a root-like fibre to fix themselves, and then push up a shoot as a commencement to the future polypidom. Polype-cells and polypes are rapidly evolved on the sides of this shoot, and nourishment being now received from an external source, and circulating through the

* So that Hedwig's axiom, adopted by M. Virey, "that the reproductive organs of animals are continuous with the life of the individual, while the reproductive organs of perennial plants, when their functions have been performed, are thrown off, and replaced in the succeeding season by others,"—must be received with some limitations.—See Tiedemann's Comp. Physiology, p. 76

whole animal, there is not merely an upward growth, but creeping tubes, "full of the same living medullary substance with the rest of the body," are projected from the base along the surface of the object of fixture. "These tubes not only secure it from the motion of the waves, but likewise from these rise other young animals or corallines, which growing up like the former, with their proper heads or organs to procure food, send out other adhering tubes from below, with a further increase of these many-headed branched animals; so that in a short time a whole grove of vesicular corallines is formed, as we find them on oysters, and other shell-fish, when we drag for them in deep water."*

There are many facts which prove that the growth of these polypidoms is very rapid, but not more so than might be anticipated when it is remembered how vast is the number of polype architects; and no sooner is a new branch extended than it becomes almost simultaneously a support of new workers which, with "toil unwearyable," add incessantly to the materials of increase. Their duration is various: some have only a summer's existence, as Campanularia geniculata; many are probably annual, and the epiphyllous kinds cannot at most prolong their term beyond that of the weed on which they grow; but such as attach themselves to rocks are probably less perishable, for their size and consistency seem to indicate a greater age: it is thus with the Tubulariæ and some of the compound Sertulariadæ.

But the life of the polypes considered abstractedly is probably in no instance coetaneous with the duration of the polypidom, for the lower parts of this become, after a time, empty of pulp and lifeless, and lose the cells inhabited by the polypes, which, in an old specimen, are to be found in a state of activity only near the summit, or on the new shoots. The Thuiaria thuja affords a remarkable example of this fact; the branches which carry the polypes dropping off in regular succession as younger ones are successively formed, so that the polypidom retains, throughout its whole growth, the appearance of a bottle-brush, the naked stem and the branched top being kept in every stage in a due proportion to each other. Sertularia argentea, Plumularia falcata, &c. are subjected to the same law,—the primary polypiferous shoots being deciduous, so that in them also the stalk becomes bare, while the upper parts are graced with a luxuriant ramification loaded with tiny architects. But in our eagerness to generalize, let us not forget that there are some species, as Sertularia pumila, abietina, &c., in which this process of successive denudation is not observable, perhaps, however, because of their form, which is not of a

* Ellis and Solander's Zoophytes, p. 33.

kind to be altered by it, and hence unnoticeable, or because the duration of the whole is too fugitive to permit the law to produce a visible effect.

There are facts which appear to prove that the life of the individual polypes is even more transitory than their own cells; that like a blossom they bud and blow and fall off or are absorbed, when another sprouts up from the medullary pulp to occupy the very cell of its predecessor, and in its turn to give way and be replaced by another. When speaking of flexible corallines Lamouroux says, "Some there are that are entirely covered with polypi through the summer and autumn, but they perish with the cold of winter: no sooner, however, has the sun resumed his revivifying influence than new animals are developed, and fresh branches are produced upon the old ones."* Of the Tubularia indivisa, Sir John G. Dalyell tells us that "the head is deciduous, falling in general soon after recovery from the sea. It is *regenerated at intervals* of from ten days to several weeks, but with the number of external organs successively diminishing, though the stem is always elongated. It seems to rise within this tubular stem from below, and to be dependent on the presence of the internal tenacious matter with which the tube is occupied. A head springs from the remaining stem, cut over very near the root; and a redundance of heads may be obtained from artificial sections, apparently beyond the ordinary provisions of nature. Thus twenty-two heads were produced through the course of 550 days, from three sections of a single stem."† The observations of Mr Harvey on the same, or a very nearly allied, species of zoophyte confirm the experiments of Sir J. G. Dalyell, so far as these have reference to the deciduousness of the polypes and their regeneration;‡ and it seems

* Corall. Flex. p. xvi.

† Edin. New Phil. Journ. xvii. p. 415.

‡ "The most singular circumstance attending the growth of this animal, and which I discovered entirely by accident, remains to be mentioned. After I had kept the clusters in a large bowl for two days, I observed the animals to droop and look unhealthy. On the third day the heads were all thrown off, and lying on the bottom of the vessel; all the pink colouring matter was deposited in the form of a cloud, and when it had stood quietly for two days, it became a very fine powder. Thinking that the tubes were dead I was going to throw them away, but I happened to be under the necessity of quitting home for two days, and on my return I found a thin transparent film being protruded from the top of every tube: I then changed the water every day, and in three days time every tube had a small body reproduced upon it. The only difference that I can discover in the structure of the young from the old heads, consists in the new ones wanting the small red *papillæ*, and in the absence of all colour in the animal."—Proceed. Zool. Soc. No. 41, p. 55.

to me not altogether unwarrantable to infer a like temporary existence and revival in those of the Sertulariadæ from a reflection on the experiments of Mr Lister,—incomplete certainly, but which prove that under certain circumstances their polypes disappear by a process of internal absorption,* and under convenient circumstances would have been renovated, as I have witnessed in similar experiments. † Had these singular facts been known to Linnæus, how eagerly and effectively would he have impressed them into the support of his favourite theory! Like the flowers of the field the heads or "flores" of these polypidoms expand their petalloid arms, which after a time fall like blighted blossoms off a tree;—they do become "old in their youth," and rendered hebetous and unfit for duty or ornament by age or accident, the common trunk throws them off, and supplies its wants by ever-young and vigorous growths. "Admiranda tibi levium spectacula rerum." The phenomena are of those which justly challenge admiration and excuse a sober scepticism, so alien are they to all we are accustomed to observe in more familiar organisms; but besides that faithful observation renders the facts undeniable, a reflection on the history of the Hydra might almost have led us to anticipate such events in the life of these zoophytes. "Verily for mine owne part, the more I looke into Nature's workes, the sooner am I induced to beleeve of her even those things that seem incredible."

I arrange the British species of this order under the following families and genera:

Family I. HYDRAIDÆ.

Polypes viviparous, the young pullulating from the body of the parent.

1. HYDRA. Polypes naked, single, locomotive.

* Phil. Trans. 1834, p. 374, 376.

† On Saturday, May 28th 1837, a specimen of Campanularia gelatinosa was procured from the shore, and after having ascertained that the polypes were active and entire, it was placed in a saucer of sea-water. Here it remained undisturbed until Monday afternoon, when all the polypes had disappeared. Some cells were empty or nearly so, others were half-filled with the wasted body of the polype, which had lost, however, every vestige of the tentacula. The water had become putrid, and the specimen was therefore removed to another vessel with pure water, and again set aside. On examining it on the Thursday (June 1st) the cells were evidently filling again, although no tentacula were visibly protruded, but on the afternoon of Friday (June 2d) every cell had its polype complete, and displayed in the greatest perfection.

Family II. TUBULARIADÆ.

Polypes gemmiparous, the gemmules naked, pullulating from the bases of the tentacula.

* No Polypidom.

2. Coryne. Polypes naked, the tentacula filiform.

3. Hermia. Polypes tunicated, the tentacula with glandular tips.

** A distinct polypidom,

4. Tubularia. Polypes not retractile within cells: Polypidoms fistular, simple or branched.

Family III. SERTULARIADÆ.

Polypes gemmiparous, the gemmules enclosed in external ovarian persistent vesicles scattered on the polypidom.

* Polype-cells sessile.

5. Thoa. Cells indistinct, tubular, the simple extremities of the interwoven branchlets.

6. Sertularia. Cells biserial, short, erect, the apertures everted.

7. Thuiaria. Cells biserial, imbedded, the apertures looking forward.

8. Plumularia. Cells uniserial; the branchlets plumose or pectinate.

9. Antennularia. Cells uniserial; the branchlets whorled.

* Polype-cells on ringed stalks.

10. Campanularia. Cells campanulate.

I. HYDRAIDÆ.

I. Hydra, Linnæus.

Character.—*Polypes locomotive, single, naked, gelatinous, subcylindrical, but very contractile, the mouth encircled with a single series of granulous filiform tentacula.*

1. H. viridis, *grass-green; body cylindrical or insensibly narrowed downwards; tentacula* 6—10, *shorter than the body.* (Fig. Vol. i. p. 236.)

Polypes verds, *Trembley*, Mem. 22, pl. 1. fig. 1; pl. 3, fig. 1—10.—— Fresh-water Polypus, *Trembley*, in Phil. Trans. Abridg. viii. 623. *Folkes*, in ibid. 676. pl. 17, and pl. 18, fig. 1—3 ——Hydra viridis, *Lin.* Faun. Suec. 367, No. 1283, *Lin.* Syst. 1320. *Mull.* Verm. I. ii. 13. Zool. Dan. prod. 230, No. 2783. *Berk.* Syn. i. 221. *Ure's* Rutherg. 232. *Turt.* Gmel. iv. 691. *Turt.* Br. Faun. 218. *Lam.* Anim. s. Vert. ii. 60. *Stew.* Elem. ii. 452. pl. 12, fig. 4, 5. *Blumenbach's* Man. 275. pl. 1, fig. 10. *Bosc* Vers ii. 274. *Stark*, Elem. ii. 443. *Woodward*, in Mag. Nat. Hist. iii. 349, fig. 89. *Roget*, Bridgew. Treat. i. 162, fig. 59, and 176—8, fig, 73—76. *Adams* on the Microscope, 399, pl. 21, fig. 5. *Carus*, Comp. Ánat. tab. 1. fig. 1.——H. viridissima, *Pall*, Elench. 31.

——Third sort of Polype, *Baker*, Polyp. 19 c. fig.——Le Polype vert, *Cuv.* Reg. Anim. iii. 295.——L'Hydre verte, *Blainv.* Actinol. 494. pl. 85, fig. 1.

Hab. Ponds and still waters, common throughout England, and the south of Scotland. In almost all the parishes in the vicinity of Glasgow, *Ure.*

The polypes of this species differ from the following, " not only in colour, but likewise in their arms, which were much shorter in proportion to their bodies, capable of but little extension, and narrower at the root than the extremity, which is contrary to the other species. Their arms were so short, they could not clasp round a very small and slender worm, but seemed only to pinch it fast, till they could master and devour it, which they did with as much greediness as any. I imagined these polypes owed their green colour to some particular food, such as weeds, &c. and that they would lose it upon being kept to worms; but I find myself mistaken, for they retain their greenness after some months as well as ever, and are now grown of a moderate size, extending sometimes three quarters of an inch; their arms are also lengthened very much to what they were, and are of a lighter green than the body, their number eight, nine, or ten. The tail is very little slenderer than the body, but more spread at the end than the tails of other kinds."—*Baker.*

Pallas says that the offspring are produced from every part of the body, while Blainville thinks he has remarked that they shoot always from the same place, " au point de jonction de la partie creuse et de celle qui ne l'est pas." Blainville is candid enough, however, to inform us that Professor Van der Hoëven had made some observations adverse to his opinion; and our own are certainly in accordance with those of Pallas and of the Professor of Leyden.

Trembley is careful to tell us that he discovered this species in June 1740, nor can we smile at the particularity of the record when we remember that the discovery is the foundation of his immortal fame. * It was first observed in England in the spring of 1743 by a Mr Du Cane of Essex. It appears to be a hardy animal. I have kept it for more than twelvemonths in a small vial of water unchanged during the whole of that time, and it remained lively, and bred freely, feeding on the minute Entomostraca confined with it, and which, propagating much more abundantly, furnished a good supply of what was evidently a favourite food.

2. H. VULGARIS, *orange-brown or sometimes oil-green; body cylindraceous; tentacula* 7–12, *as long or longer than the body.*

* " Trembley (Abraham), de Genéve, né en 1710, mort en 1784; *immortel* par le découverte de la reproduction du polype." Cuvier, Reg. Animal. iii. 422.

Polypes de la seconde espéce, *Tremb.* Mem. pl. 1, fig. 2, 5; pl. 2. fig. 2; pl. 6. fig. 2 and 8; pl. 8. fig. 1—7; pl. 10. fig. 1—7; pl. 11, 12, 13. figs. omn. partly copied in *Adams*, Micros. 399, pl. 21. fig. 6.——Hydra vulgaris, *Pall.* Elench. 30. *Ellis* and *Soland.* Zooph. 9.——H. grisea, *Lin.* Syst. 1320. *Mull.* Zool. Dan. Prod. 230, No. 2784. Verm. i. ii. 14. *Ure's* Rutherg. 233. *Berk.* Syn. i. 222. *Turt.* Gmel. iv. 692. *Turt.* Brit. Faun. 218. *Stew.* Elem. ii. 452. *Lam.* Anim. s. Vert. ii. 60. *Bosc*, Vers ii. 275. *Stark*, Elem. ii. 443. *Templeton* in Mag. Nat. Hist. ix. 418.—H. brunnea, *Templeton*, loc. cit. 417. fig. 56.—— First sort of Polype, *Baker*, Polyp. 17. c. fig.——L'Hydre commune, *Blainv.* Actinol. 495.

Hab. Weedy ponds and slowly running waters. Probably common in all parts of the kingdom.

On comparing the descriptions of the authors quoted above, I am led to conclude that this species is either subject to much variety, or that two species have been confounded together, and given rise to a discrepancy which seems otherwise irreconcileable. My own experience inclines me to the latter supposition, but since I have had no opportunities of making observations on specimens from different and distant localities, I deem it more prudent to indicate what appear to be two species as only varieties of the *vulgaris*, until the point can be settled by more leisured naturalists.

Var. a. aurantia, *light reddish-brown or orange-coloured; tentacula not longer than the body.* Plate X. Fig. 1.

Var. b. grisea, *light olive-green; tentacula paler and longer than the body.* Plate X. Fig. 2.

The first is by much the commoner, and does not exceed the H. viridis in size, which it resembles also in its habits and form. It is always of an orange, brown, or red colour, the intensity of the tint depending on the nature of the food, on the state of the creature's repletion, becoming even blood-red when fed upon the small crimson worms and larvæ which usually abound in its haunts.* The tentacula in all my specimens have never exceeded the length of the body, are usually seven or eight in number, and taper to the point insensibly. Every part of the body is generative of young, which may frequently be seen hanging from the parent at the same time in different stages of their growth. Baker's figure represents this variety very well.

The second is a larger animal and comparatively rare, less sensible to external impressions, and of a more gracile form. Its colour is a dilute olive-green with paler tentacula, which are considerably longer than the body, and hang like silken threads in the water, waving to and fro without assuming that regular circular disposition which they

* "I have found a *bright red* Hydra rather abundant on Putney Heath, near London. It does not much differ, except in colour, from the green one." *J. E. Gray in lit. May* 6, 1833. See Trembley's Mem. p. 47, and 128.

commonly do in the H. viridis. I have not observed more than one young at a time, pullulating from near the middle of the body, and after this has attained a certain growth, the polype has the appearance of being dichotomously divided.

Dr Fleming's *Hydra vulgaris*, Brit. Anim. 553, embraces this and the preceding, as well as the following species, which are considered the mere variations of one protean original;—

> "Facies non omnibus una,
> Nec diversa tamen:"—

but the conviction of their permanent distinctness has been forced upon me by a long continuous observation of individuals in a state of confinement. Had, however, personal observation been awanting, the same conclusion would have been willingly adopted on the paramount authorities of Trembley and Baker, who had very carefully studied these creatures; and Pallas speaks very decidedly to the same purport. "Species Hydræ a Linnæo * pro varietatibus habitas, a Ræselio primum bene determinatas adoptavi, cum de trium priorum constantia, propria me experientia certissimum reddiderit."—*Elench.* 29.

3. H. FUSCA, *brown or griseous; inferior half of the body suddenly attenuated; tentacula several times longer than the body.*

Polypes à long bras, *Tremb.* Mem. pl. 1. fig. 3, 4, 6; pl. 2. fig. 1, 3, 4; pl. 3, fig. 11; pl. 5, fig. 1–4; pl. 6, fig. 3–7, 9, 10; pl. 8. fig. 8, 11; pl. 9. copied in *Adams*, Micros. 399, pl. 21, fig. 7, 8; pl. 23, A. B; pl. 24, A. B. fig. omnes. *Cuv.* Reg. Anim. iii. 295.——Long armed fresh-water Polype, *Ellis*, Corall. xvi. pl. 28. fig. C. (the tentacula shortened for the conveniency of introducing them within the size of the plate.)——Second sort of Polype, *Baker*, Polyp. 18 c. fig.——Hydra oligactis, *Pall.* Elench. 29.——H. fusca, *Lin.* Syst. 1320. *Ellis* and *Soland.* Zooph. 9. *Berk.* Syn. i, 221. *Turt.* Gmel. iv. 691. *Turt.* Brit. Faun. 218. *Stew.* Elem. ii. 452. *Lam.* Anim. s. Vert. ii. 60. *Bosc* Vers, ii. 275.——L'H. brune, *Blainv.* Actinol. 495.

Hab. Still waters in England, rare. In a pond at Hackney, *Mr John Ellicot.* †

"The tails of these are long, slender and transparent, and when placed before the microscope, a long straight gut may plainly be distinguished passing from the body-part or stomach to an opening at the end thereof. These are rather lighter coloured than the former, (H. vulgaris,) and have seldom more than six or eight arms, but those capable of great extension."—*Baker.*

Baker reckoned that his English exemplers were of a sort different from those he had received from M. Trembley, but the only apparent

* In the 10th edit. of Syst. Nat. p. 816, under the name of *Hydra Polypus.*

† Elected F. R. S. Oct. 26, 1738; and the author of several papers on subjects in Natural Philosophy, published in the Phil. Trans. between the years 1745 and 1750. He was a watch-maker, and died in 1772.

difference lies in the greater shortness of the tentacula of the former, and this is a character liable to considerable variation, and insufficient of itself for specific distinction. The species has been beautifully illustrated, in Trembley's "Mémoires," by the pencil and graver of the celebrated Lyonet, for it is an interesting fact that all the figures, and most of the plates, which adorn the admirable book just mentioned, were drawn and etched by the author of the "Traité anatomique de la chenille du saule,"* and are indeed among the very earliest specimens of his extraordinary attainments in these arts.

It may be worth while to call attention to the remarkable resemblance of the Hydra fusca to the *Cucullanus cirratus* of Muller, Zool. Dan. tab. 38, fig. 1–7, which is an intestinal worm!

4. H. VERRUCOSA, *pale cinereous; body pedunculate, campaniform; tentacula longer than the body.*

Hydra verrucosa, *Templeton*, in Mag. Nat. Hist. ix. 418, fig. 57.

Hab. Still waters. "In the pond at Cranmore (near Belfast,) Sept. 1812," *J. Templeton, Esq.*

"Of a pale cinereous hue, with six verrucated tentacula, of moderate length, and nearly equal thickness."——"This species, when at rest, assumes more of a campanulate form than any other species of the genus, except lutea and the following. The warts are not uniformly diffused, as in pallens; nor do the tentacula diminish much in size towards the tips."—*Templeton.*

** *Marine species.*

5. H.? LITTORALIS, "*white; head large; about* 10 *extremely short tentacula encircling the base.*" Robt. Jameson. †

Hydra lutea? *Jameson*, in Wern. Mem. i. 565.—H. lutea, *Flem.* Brit. Anim. 554.—H. corynaria, *Templeton*, in Mag. Nat. Hist. ix. 419, fig. 58.

Hab. Sea shore, adhering to Fuci. Frith of Forth, *Professor Jameson.* "Found adhering to Fucus vesiculosus, at White House Point, Belfast Lough, Oct. 1810," *J. Templeton, Esq.*

The figure represents a branched animal with enlarged clavate heads encircled round the truncate apex, with tentacula rather shorter than the diameter.—To justify the change I have made in the name, it is only necessary to mention that nothing can be more certain than

* "Ouvrage qui est à la fois le chef-d'œuvre de l'anatomie et celui de la gravure."—*Cuvier.*

† The name affixed to the specific characters is that of the person who, so far as I have been able to ascertain the point, added the species to the British Fauna.—Mr Jameson is the present Regius Professor of Natural History in the University of Edinburgh.

that this species is not identical either with the Hydra lutea or corynaria of Bosc.

Obs. Leuwenhoek * discovered the Hydra in 1703, and the uncommon way its young are produced, and an anonymous correspondent of the Royal Society made the same discovery in England about the same time, but it excited no particular notice until Trembley made known its wonderful properties, about the year 1744. These were so contrary to all former experience, and so repugnant to every established notion of animal life, that the scientific world were amazed; and while the more cautious among naturalists set themselves to verify what it was difficult to believe, there were many who looked upon the alleged facts as impossible fancies. The discoveries of Trembley were, however, speedily confirmed; and we are now so familiar with the outlines of the history of the fresh-water polype, and its marvellous reproductive powers, that we can scarcely appreciate the vividness of the sensation felt when it was all novel and strange; when the leading men of our learned societies were daily experimenting on these poor worms, and transmitting them to one another from distant countries, by careful posts, and as most precious gifts; and when even ambassadors interested themselves in sending early intelligence of the engrossing theme to their respective courts.

The Hydræ are found in fresh and, perhaps, also in salt waters, but the former species only have been examined with care, and are the objects of the following remarks. They prefer slowly running or almost still water, and fasten to the leaves and stalks of submerged plants by their base, which seems to act as a sucker. The body is exceedingly contractile, and hence liable to many changes of form: when contracted it is like a tubercle, a minute top or button, and when extended it becomes a narrow cylinder, being ten or twelve times longer at one time than at another, the tentacula suffering changes in their length and diameter equal to those of the body. "It can lengthen out or shorten its arms, without extending or contracting its body; and can do the same by the body, without altering the length of its arms: both, however, are usually moved together, at the same time and in the same direction."—The whole creature is apparently homogeneous, composed of minute pellucid grains cohering by means of a transparent jelly, for even with a high magnifier no defined organization of vessels and fibres can be detected. On the point opposite the base, and in the centre of the tentacula, we observe an aperture

* "Antonius v. Leeuwenhoek, civis Delphensis, peritus vitrorum politor, curiosus, et ad paradoxas opiniones pronus." Haller, Bib. Bot. i. 583. He was born 1632; elected F. R. S. January 1680; and died in 1723.

or mouth which leads into a wider cavity excavated as it were in the midst of the jelly,* and from which a narrow canal is continued down to the sucker. When contracted, and also when fully extended, the body appears smooth and even, but "in its middle degree of extension," the sides seem to be minutely crenulated, an effect probably of a wrinkling of the surface, although from this appearance Baker has concluded that the Hydra is annulose, or made up of a number of rings capable of being folded together or evolved, and hence, in some measure, its extraordinary ability of extending and contracting its parts.† That this view of the Hydra's structure is erroneous, Trembley has proved;‡ and the explanation it afforded of the animal's contractility was obviously unsatisfactory, for it was never pretended that such an anatomy could be detected in the tentacula, which, however, are equally or more contractile. These organs encircle the mouth and radiate in a star-like fashion, but they seem to originate a little under the lip, for the mouth is often protruded like a kind of small snout: they are cylindrical, linear or very slightly tapered, hollow and roughened, at short and regular intervals, with whorls of tubercles which, under the miscroscope, form a very beautiful and interesting object; and I have thought, when viewing them, that every little tubercle might be a cup or sucker similar to those which garnish the arms of the cuttle-fish. § Trembley has shewn us that this is a deception, and that there is really no exactness in the comparison.‖

* Pallas denies this. "Ab alimento recepto *cavatæ*, inquam, haud enim Hydræ corpus naturaliter intestini instar cavum crediderim. Totum solidum et medullare, pro admoto alimento, ceræ instar, digitim admittentis, cavari concipio parenchyma et alimentis insinuatis sese circumfundere. Qui alias per longitudinem dissecta Hydra, illico qualibet portione deglutire, et cavo clauso alimenta condere posset? quod tamen observare rarum non est." Elench. Zooph. 27, 28.—For a view of the Hydra's stomach see Tremb. Mem. pl. 4, fig. 7, copied by Roget in his Bridgew. Treat. ii. 74. fig. 241.

† "The outward coat is white like the arms, and made up of minute *annuli* or ringlets, that double in the midst, and can, occasionally, be folded close together, in the manner of a paper lanthorn."—Hist. of the Polype, 25.

‡ Mem. 27.

§ Pallas has the same suggestion. Elench. 26. See also Roget's Bridgew. Treat. i. 182.—Baker says that "two or three pretty long hairs" issue from each of the papillæ or tubercles, p. 36.; and Trembly has figured a short hair issuing from some of them, Mem. 62, pl. 5, fig. 3. This appearance of hairs is, I presume, produced by the glutinous secretion from them being drawn out into fine lines and drying on the glass. The tentacula probably adhere to foreign bodies principally by means of a mucous excretion, and being as it were engrained into the microscopic interstices of the body to which they are applied.—Tremb. Mem. 46.

‖ Mem. 108.

The tentacula are amazingly extensible, from a line or less to one or, as in H. fusca, to more than eight inches; and "another extraordinary circumstance is, that a polype can extend an arm in any part of its whole length, without doing so throughout, and can swell or lessen its diameter, either at the root, at the extremity, in the middle, or where it pleases: which occasions a great variety of appearances, making it sometimes terminate with a sharp point, and at other times blunt, knobbed, and thickest at the end, in the figure of a bobbin." We naturally enquire how this wonderful extension is made,—by what power a part without muscularity is drawn out until it exceeds by twenty or even by forty times the original length? The dissections of Trembley have proved beyond any doubt that the body is a hollow cylinder or bowel, and that the tentacula are tubular and have a free communication with its cavity;* and in this structure, combined with the loose granular composition of the animal, we find an answer to the question. Water flows, let us say by suction, into the stomach through the oral aperture, whence it is forced by the vis a tergo, or drawn by capillary attraction, into the canals of the tentacula, and its current outwards is sufficient to push before it the soft yielding material of which they are composed, until at last the resistance of the living parts suffices to arrest the tiny flood, or the tube has become too fine in its bore for the admission of water attenuated to its smallest possible stream,—how inconceivable slender may indeed be imagined, but there is no thread fine enough to equal it, seeing that the tentacula of Hydra fusca in tension can be compared to nothing grosser than the scarce visible filament of the gossamer's web.

The Hydra, though usually found attached, can nevertheless move from place to place, which it does either by gliding with imperceptible slowness on the base, or by stretching out the body and tentacula to the utmost, fixing the latter, and then contracting the body towards the point of fixture, loosening at the same time its hold with the base; and by reversing these actions it can retrograde. Its ordinary position seems to be pendant or nearly horizontal, hanging from some floating weed or leaf, or stretching from its sides. In a glass of water the creature will crawl up the sides of the vessel to the surface, and hang from it, sometimes with the base, and sometimes with the tentacula downwards; and again it will lay itself along horizontally.† Its locomotion is always very slow, and the disposi-

* Mem. 123—5; and 263.

† "The position in which they appear to take most delight, is that of remaining suspended from the surface of the water by means of the foot alone: and

tion of the zoophyte is evidently sedentary ; but the contractions and mutations of the body itself are sufficiently vivacious, while in seizing and mastering its prey it is surprisingly nimble ; seizing a worm, to use the comparison of Baker, " with as much eagerness as a cat catches a mouse." It is dull and does not expand freely in the dark, but enjoys light, and hence undoubtedly the reason why we generally find the Hydra near the surface and in shallow water.

The Hydræ are very voracious, feeding only on living animals,* but when necessary they can sustain a fast of many weeks without other loss than what a paler colour may indicate. Small larvæ, worms, and entomostracous insects seem to be the favourite food, and to entrap these they expand the tentacula to the utmost and spread them in every direction, moving them gently in the water to increase their chances, and when a worm, &c. touches any part of them it is immediately seized, carried to the mouth by these flexible and contractile organs, and forced into the stomach. " 'Tis a fine entertainment," says Baker, " to behold the dexterity of a polype in the mastering its prey, and observe with what art it evades and overcomes the superior strength or agility thereof. Many times, by way of experiment, I have put a large worm to the very extremity of a single arm, which has instantly fastened on it with its little invisible claspers. Then it has afforded me inexpressible pleasure, to see the polype poising and balancing the worm, with no less seeming caution and judgment than a skilful angler shows when he perceives a heavy fish at the end of a single hair-line, and fears it should break away. Contracting the arm that holds it, by very slow degrees, he brings it within the reach of his other arms, which eagerly clasping round

this they effect in the following manner. When the flat surface of the foot is exposed for a short time to the air, above the surface of the water, it becomes dry, and in this state exerts a repulsive action on the liquid, so that when dragged below the level of the surface, by the weight of the body, it still remains uncovered, and occupies the bottom of a cup-shaped hollow in the fluid, thereby receiving a degree of buoyancy, sufficient to suspend it at the surface. The principle is the same as that by which a dry needle is supported on water, in the boat-like hollow which is formed by the cohesive force of the liquid, if care be taken to lay the needle down very gently on the surface. If, while the Hydra is floating in this manner, suspended by the extremity of the foot, a drop of water be made to fall upon that part, so as to wet it, this hydrostatic power will be destroyed, and the animal will immediately sink to the bottom."—Roget, Bridgw. Tr. i. 179. This passage is nearly a literal translation from Trembley's Hist. des Polypes, p. 37–8.

* In confinement, however, Trembley found that they might be fed on minced fish, beef, mutton, or veal.—Mem. 104.

it, and the danger of losing it being over, all the former caution and gentleness is laid aside, and it is pulled to the polype's mouth with a surprising violence." * Sometimes it happens that two polypes will seize upon the same worm, when a struggle for the prey ensues, in which the stronger gains of course the victory ; or each polype begins quietly to swallow his portion, and continues to gulp down his half until the mouths of the pair near and come at length into actual contact. The rest which now ensues appears to prove that they are sensible of their untoward position, from which they are frequently liberated by the opportune break of the worm, when each obtains his share, but should the prey prove too tough, woe ! to the unready ! The more resolute dilates the mouth to the requisite extent, and deliberately swallows his opponent, sometimes partially, so as, however, to compel the discharge of the bait, while at other times the entire polype is engulped ! But a polype is no fitting food to a polype, and his capacity of endurance saves him from this living tomb, for after a time, when the worm is sucked out of him, the sufferer is disgorged with no other loss than his dinner. † This fact is the more remarkable when it is contrasted with the fate which awaits the worms on which they feed. No sooner are these laid hold upon than they evince every symptom of painful suffering, but *their violent contortions are momentary and a certain death suddenly follows their capture.* How this effect is produced is mere matter of conjecture. Worms, in ordinary circumstances, are most tenacious of life even under severe wounds, and hence one is inclined to suppose that there must be something eminently poisonous in the Hydra's grasp, as it is impossible to believe, with Baker, that this soft toothless creature can bite and inject a venom into the wound it gives. " I have sometimes," says Baker, " forced a worm from a polype the instant it has been bitten, (at the expence of breaking off the polype's arms,) and have always observed it to die very soon afterwards, without one single instance of recovery."‡ To the Entomostraca, however, its touch is

* Hist. of the Polype, 65. Also Roget's Bridgw. Treat. ii. 76.

† Trembley, Mem. 112.

‡ Hist. of the Polype, 33—comp. with 67–8.—" That insignificant and inactive insect called the fresh water polypus, of all poisonous animals, seems to possess the most powerful and active venom. Small water-worms, which the polypus is only able to attack, are so tenacious of life, that they may be cut to pieces without their seeming to receive any material injury, or to suffer much pain from the incisions. But the poison of the polypus instantly extinguishes every principle of life and motion. What is singular, the mouth or lips of the polypus have no sooner touched this worm than it expires. No wound, however, is to be perceived in the dead animal. By experiments made with the

not equally fatal, for I have repeatedly seen Cyprides and Daphniæ entangled in the tentacula and arrested for some considerable time, escape even from the very lips of the mouth, and swim about afterwards unharmed; perhaps their shell may protect them from the poisonous excretion.—The grosser parts of the food, after some hours' digestion, are again ejected by the mouth; but, as already mentioned, the stomach is furnished with what in one sense, may be called an intestine to which, according to Trembley and Baker, there is an outlet in the centre of the base, and the latter asserts that he has, "several times, seen the dung of the polype in little round pellets discharged at this outlet or anus."*

But the Hydra is principally celebrated on account of its manner of propagation. It is of course like zoophytes in general, asexual; and every individual possesses the faculty of continuing and multiplying its race, principally, however, by the process of subdivision. During the summer season, a small tubercle rises on the surface, which lengthens and enlarges every hour, and in a day or two developes in irregular succession, or in successive pairs, ‡ a series of tentacula, and becomes in all respects, excepting size, similar to its parent. It remains attached for some time, and grows and feeds, and contracts and expands after the fashion of this parent, until it is at length thrown off by a sort of sloughing or exfoliation. These buds sprout, in the common species, from every part of the surface of the body, but not from the tentacula; and very often two, three or four young may be seen depending at one time from the sides of the fruitful mother, in different stages of growth, every one playing its part independent of the others. They are evolved with rapidity in warm weather especially, and no sooner has one dropt off than another begins to germinate; "and what is most extraordinary, the young ones

best microscopes, it has been found, that the polypus is neither provided with teeth, nor any other instrument that could pierce the skin." Smellie's Phil. of Nat. History, ii. 462.—The fact that fishes cannot be made to swallow Hydræ, seems to prove the presence of some irritating quality in the latter.—See Trembley, Mem. 137.

* Lib. s. cit. 27.—He adds,—"Much the greater and grosser part of what the polype eats, is most certainly thrown out again by the mouth, after lying a proper time to become digested in the stomach: and, for a good while, I imagined there was no other evacuation; but am now convinced, that the finer part, in small quantity, is carried downwards through the tail, and passed off that way. I believe, however, there is also another purpose to which this passage serves, and that is, to convey a mucus or slimy matter to the end of the tail, for its more ready adhesion to sticks, stalks, or other bodies."

† Baker's Hist. 35.

themselves often breed others, and those others sometimes push out a third or fourth generation before the first fall off from the original parent."—Trembley found in one experiment that an individual of H. grisea produced forty-five young in two months; The average number per month in summer was twenty, but as each of these began to produce four or five days after its separation, the whole produce of a month was prodigious. *

"No sooner is a young one furnished with arms, than it seizes and devours worms with all possible eagerness; nor is it an unusual thing to behold the young one and the old one struggling for, and gorging different ends of the same worm together. Before the arms come out, and even sometime afterwards, a communication continues between the bodies of the old and young, as appears beyond dispute by the swelling of either when the other is fed.† But a little before the young one separates, when its tail-end begins to look white, transparent, and slender, the passage between them, I believe, is closed. And when the young one comes away, there remains not the least mark where it had been protruded."—"After a young polype once gets all its arms, it alters indeed in size, but neither appears to shift its skin, or undergo any of the changes most other insects do." ‡

Instead of buds or little protuberances, the body sometimes pushes forth single tentacula scattered irregularly over it, and these tentacula can be metamorphosed into perfect polypes, the base swelling out to become the body, which, again soon shoots out additional tentacula to the requisite number! §

This is a mode of generation which the term viviparous does not correctly embrace, unless we give to that word a signification so extensive as to include all generations which are not oviparous: It is an example of equivocal, or what some foreign physiologists denominate, the generation by the individualisation of a tissue previously or already organized, ‖—and seems to be the usual way of propaga-

* Mem. pour l'Hist. des Polypes, 174—5. Also Baker, lib. s. cit. 53—4.

† By some clever dissections, Trembley demonstrated the reality of this communication. Mem. 161—2.

‡ Baker lib. s. cit. 50. § Baker ut cit. 110—11 : 121—3.

‖ La génération n'est pas pour cela spontanée : une *génération spontanée* doit être la production d'un être organisé de toutes pièces, lorsque des élémens inorganiques se réuniront pour produire un animal, une plante. Cette génération est impossible, et n'a jamais lieu. Une *génération équivoque* est celle où des tissus organisés préalablement par un être déjà pourvu de vie, *s'individualisent*, c'est-a-dire se séparent de la masse commune et participent encore, après cette séparation, de l'état dynamique de la masse, c'est-à-dire de sa vie, mais, à son propre profit. C'est ainsi qu'un tissu produit un Entozoaire. C'est de la vie continuée."—Ch. Morren in Ann. des Sc. Nat. an. 1836, Vol. vi. p. 90. *Part. Zool.*

tion among the Hydræ during the summer months. But in autumn the Hydra generates internal oviform gemmules which, extruded from the body, lie during the winter in a quiescent state, and are stimulated to evolution not until the return of spring and its genial weather. Few observations have been made on these apparent ova, so that their structure, their source, their manner of escape from the body, and their condition during winter are scarcely known, Trembley describes them as little spherical excrescences, of a white or yellow colour, attached to the body by a very short pedicle. He never saw more than three on the same polype. After sometime they became separate, and fell to the bottom of the glass of water in which the creatures were kept, where they came to nothing, excepting one only which was presumed to have evolved into a polype, for although his experiment renders this conclusion probable, it was still rather an inference than an actual observation, so much so, that Trembley continued to entertain doubts of their nature. Jussieu, it seems, conceived that each little excrescence was a vesicle filled with ova of microscopic minuteness, but there is no foundation for any such hypothesis.*

These are the modes in which the Hydra naturally multiplies its kind, but it can be increased, as already hinted, by artificial sections of the body, in the same manner that a perennial plant can be by slips and shoots. If the body is halved in any direction, each half in a short time grows up a perfect Hydra; if it is cut into four or eight, or even minced into forty pieces,† each continues alive and developes a new animal, which is itself capable of being multiplied in the same extraordinary manner. If the section is made lengthways, so as to divide the body into two or more slips connected merely by the tail, they are speedily resoldered, like some heroes of fairy tale, into one perfect whole; or if the pieces are kept asunder, each will become a polype, and thus we may have two or several polypes with only one tail between them; but if the sections be made in the contrary direction—from the tail towards the tentacula—you produce a monster with two or more bodies and one head. If the tentacula,—the organs by which they take their prey, and on which their existence might seem to depend,—are cut away, they are reproduced, and the

* Trembley, Mem. 196—7.

† "J'ai ouvert sur ma main un Polype, je l'ai étendu, et j'ai coupé en tout sens la peau simple qu'il formoit, je l'ai reduit en petits morceaux, je l'ai en quelque maniére haché. Ces petits morceaux de peau, tant ceux qui avoient des bras, que ceux qui n'en avoient point, sont devenus des Polypes parfaits."—Trembley, Mem. 248.

lopt off parts remain not long without a new body: if only two or three tentacula are embraced in the section, the result is the same; and a single tentaculum will serve for the evolution of a complete creature.* When a piece is cut out of the body the wound speedily heals, and, as if excited by the stimulus of the knife, young polypes sprout from the wound more abundantly, and in preference to unscarred parts; when a polype is introduced by the tail into another's body, the two unite and form one individual; and when a head is lopt off it may safely be ingrafted on the body of any other which may chance to want one. You may slit the animal up, and lay it out flat like a membrane, with impunity; nay it may be turned inside out, so that the stomachal surface shall become the epidermous, and yet continue to live and enjoy itself.† And the creature seems even to suffer very little by these apparently cruel operations, for before the lapse of many minutes, the upper half of a cross section will expand its tentacula and catch prey as usual; and the two portions of a longitudinal division will, after an hour or two, take food and retain it. "A polype cut transversely, in three parts, requires four or five days in summer, and longer in cold weather, for the middle piece to produce a head and tail, and the tail part to get a body and head, which they both do in pretty much the same time. The head part always appears a perfect polype sooner than the rest." "And what is still more extraordinary, polypes produced in this manner grow much larger, and are far more prolific, in the way of their natural increase, than those that were never cut. It is very common, when a polype is divided transversely, to see a young one push out from one or other of the parts, and sometimes from both of them, in a very few hours after the operation has been performed: and, particularly from the tail part, two or three are frequently protruded in different places, and at different times, long before that part acquires a new head, and consequently whilst it can take in no fresh nourishment to supply them with: and yet the young ones proceeding from it, under these

* From the experiments of Trembley, (Mem. 235,) of a correspondent of Baker's and of Baker himself, it would seem that a tentaculum cannot produce a new body, unless a part of the head or body is removed with it (Hist. 193–4,); but other experimentalists are said to have succeeded when this was not done. For the particulars stated in the text, and others equally incredible, the reader may consult the works of Trembley and Baker, *passim*.

† Trembley had several by him "that have remained turned in this manner; their inside is become their outside, and their outside their inside: they eat, they grow, and they multiply, as if they had never been turned."—Phil. Trans. Abridg. viii. 627; and his Mem. 253, &c.

disadvantages, thrive as fast, and seem as vigorous as those produced by perfect and uncut polypes."*

When such things were first announced—when to a little worm the attributes of angelic beings were assigned †—it is not wonderful that the vulgar disbelieved, albeit credulity may be their besetting sin, when even naturalists, familiar with all the miracles of the insect world, were amazed and wist not what to do. "Il faut"—exclaimed Reaumur—"il faut porter la foi humaine plus loin qu'il n'est permis à des hommes eclairés, pour le croire sur le premier témoignage de celui qui le raconte, et assure l'avoir vu. Peut-on se resoudre à croire qu'il y ait dans la nature des animaux qu'on multiplie en les hachant, pour ainsi dire, par morceaux ?" ‡ But this illustrious naturalist was himself the first to promulgate, and experimentally to verify the discoveries of Abraham Trembley, which have been fully confirmed by many subsequent inquirers, and are now made so familiar to us by their admission into elementary works and treatises on natural theology, that we read of them with little surprise and without incredulousness.

(*To be continued.*)

V.—*On a Confervoid State of Mucor clavatus, Lk.* By the Rev. M. J. Berkeley, M. A. F. L. S.

Though great advance has of late years been made, not only in the study, but in the manner of studying cryptogamic plants, it is plain from the pertinacious adherence of many botanists to their old habits of looking rather to external and accidental, than to internal and essential characters, that there is much room for improvement. In consequence of this, mycology and other branches of cryptogamic botany are still overloaded with a mass of anomalous productions,

* Baker, lib. s. cit. 92, 93.

† "Vital in every part, not as frail Man
In entrails, heart or head, liver or veins,
Cannot but by annihilating die;
Nor in their liquid texture mortal wound
Receive, no more than can the fluid air:
All heart they live, all head, all eye, all ear,
— — — — and, as they please,
They limb themselves, and colour, shape or size
Assume, as likes them best."

Milton.

‡ Hist. des Insectes, vi. pref. 49.

which are, in fact, nothing else but unusual or undeveloped states of different species. Hence we find amongst Algæ certain states of various Fungi, Lichens, Mosses, and Ferns, while amongst Fungi we have the infant state of many species (Mycelia) arranged under distinct genera. Indeed in the new system of Fungi which is now in the course of publication, by Dr T. F. L. Nees von Esenbeck, we still find such a genus as Himantia retained, though it is almost impossible for practical botanists not to observe the actual developement of the productions of which it is formed into perfect Hymenomycetous Fungi. Again in a late number of a supplement to Bulliard, by M. Letellier, a new species of Geoglossum is formed out of a state of one of the Mycelia, denominated by authors Ozonium auricomum, a state, it is to be observed, noticed long ago by Withering and Sir J. E. Smith. Many other instances might be noted in which such productions are either again enumerated as autonomous fungi, or new forms described. It is with great justice that Fries complains, that although he has again and again called the special attention of botanists to this point, his labour at present seems to have been all but useless. He expresses, however, his determination of persevering, and his conviction that his views will at length be adopted.

No tribe has afforded more of such doubtful productions than the Mucedines, from many of the more common species being more or less perfectly developed with such ease and celerity in various situations and circumstances. The sporidia of many germinate in situations in which their true habit is never assumed, in liquids for instance; and such imperfect states have been generally considered as Algæ. The habit, indeed, of arranging these Mycelia or masked fungi amongst the algæ had obtained some years since, such irresistible influence, that, aided by a habit of theorizing, M. Carus, though absolutely witnessing the curious forms assumed by the same species under different degrees of moisture, considered the circumstance as proof of the possibility of plants essentially belonging to one order giving origin to plants of an order entirely distinct, under a different adjustment of the elements. (Act. Nov. Leop. 1823, t. 58.) Very lately a volume has been published, which at present I have only had an opportunity of casually inspecting in the Library of M. Desmazieres, on these confervoid forms of Mucedines, by Dr Biasoletto of Triest, in which they are considered as belonging to distinct genera of the order Algæ.

Having had the good fortune of witnessing the perfect develope-

ment of a very extraordinary production of this nature, which on a slight inspection, without carefully weighing its nature, had all the appearance of being a true Algæ, I take an early opportunity of communicating the fact which I have witnessed, as a multiplication of observations of this nature will alone induce cryptogamists generally to consider the matter in its true light.

On the 17th of March a quantity of raisin wine was made in the usual manner, with the exception that boiling water was used. The quantity, however, of water applied at once was not sufficient to communicate a high temperature to the mash. The weather which succeeded was so extremely cold that fermentation did not take place, and it was not convenient to place the tub in a proper temperature. In a few days the surface was spotted with white patches of mould, which when perfectly developed proved to be Penicillium candidum, Lk. at least the plant was extremely small, and the sporidia never acquired any colour. Meanwhile a few confervoid tufts floating just beneath the surface became visible. This was first observed on the 1st of April, and in a few days the whole surface was coated with a thick scum, of the same colour as the liquor, resembling a piece of cotton wadding immersed in it, or some of the more slender Confervæ, such as C. sordida, when the green tint has passed away. This production was examined at the time, and found to consist of an intricate mass of branched threads, the branches being often set on at a right angle. Towards the base they were generally more or less unequal, very irregular, without articulations, giving out here and there, scattered or tufted, more slender root-like branches. Towards the surface, the threads became articulated, but varying extremely in the length and forms of the divisions, some being nearly cylindrical, and in length exceeding the diameter many times, while others were very much swollen, and often almost globular. Occasionally there seemed an effort to form a sporangium. All were filled with a pale grumous nucleus, in which a few distinct granules were visible. Though resembling Confervæ in some points, I was convinced, from the irregularity in the manner of articulation, and from a certain indescribable habit, that the plant before me was a state of some mould. The scum being removed was accordingly saved, but it underwent no further developement. As often, however, as the wine was cleared, the production was again developed, without affecting very sensibly the taste or quality of the wine. Fermentation not taking place, the tub was

at length placed in a room in which a fire was constantly kept up, the temperature being seldom below 60° of Fahrenheit, and the patches soon became smaller, but indicated signs of fructification. It was in a short time clear that the plant was a state of Mucor clavatus, Lk. which was further proved by the developement of that species upon the skins of the raisins, which had been thrown into a tub in which were some brewers' grains. It is curious that in this latter case there was scarcely any trace of a Mycelium.

The Mycelium of the Penicillium before fructification, though more or less submerged, had little in it remarkable, consisting of extremely fine branched, articulated, pellucid threads.

a. State of Mucor clavatus, in outline, highly magnified. *b*. A portion of the same to show the contents of the articulations. *c*. Perfect fertile threads, with sporangia and columella.

REVIEWS AND CRITICAL ANALYSIS.

Voyage Scientifique en Morée. Paris. Levrault.

When it was determined to employ the combined arms of England and France in order to clear Greece of the remains of the barbaric race of Othman, the opportunity was not lost by the French government, and with the laudable zeal for science, which, amid the motley changes we have witnessed in these days, has never ceased to animate the various parties who have successively ruled at Paris, a sort of ambulant Institute, resembling on a smaller scale the celebrated body which accompanied the Egyptian expedition, was fitted out, with a view to explore the classic and almost unwrought soil their arms were called on to visit.

The result of the labours of this commission has been recently made public, and we shall proceed to analyse such parts of it as the nature of this publication permits. Although we must in candour say that we have risen from the examination of it with a considerable feeling of disappointment, and that when we consider the means at the disposal of the commission, the time devoted to it, and the power they possessed of perambulating a region of comparatively small extent, and perfectly accessible in every point; as well as the vast advantage of visiting a country which, as far as natural science is concerned, with the exception of the botany of Sibthorp, might be said to be unexplored, we felt entitled to expect that more might, and in fact ought to have been done;—nevertheless they have brought to light some very interesting facts, which we shall lay before our readers, following the course of the publication itself.

The work contains a sort of personal narrative of the parties engaged, a summary of the observations on mammalia, reptiles, insects, fishes, botany, geology, antiquities, statistics, and topography. There is a large volume filled with drawings and illustrations of various kinds, most of them well executed, and of great interest and value; but we certainly think that the many sheets occupied by landscape

views in lithography, although well executed, might have been advantageously bestowed on objects of higher value, leaving these subjects of amateur interest in the hands of private individuals, who would have been sure to avail themselves of the opportunity of publishing them. Nearly a year was devoted to the expedition, which sailed from Toulon in January 1829, and returned in December of the same year, previous to which it had been suddenly stopped in its career by the dreadful pestilence of malaria, or marsh intermittent fever, which in all ages has infected the shores of Greece, and the prevalence of which has been increased by the want of cultivation consequent on the invasion of the Mahometans. For this very serious result, we conceive some parties, either the government at home, or those in immediate command of the commission, must have been very highly to blame. Every one who has the slightest knowledge of the Mediterranean is aware, that after the summer solstice the marshy shores of nearly the whole range on both sides is subject to this fever, which increases in force with the advance of the season, and attains its maximum of virulence in the beginning of September, after which it is checked by the rains, which in general fall from the 10th to the 18th of that month, and induce a salutary and beneficial, as well as most agreeable, change in the temperature. Not only the general precautions founded on the knowledge of this unvarying course of nature were unnoticed, but the common and unerring warnings of danger, the presence of myriads of musquitos, which assailed them in the deltas and marshes of Western Greece, were equally disregarded, until they were roused to the sense of their situation by a simultaneous attack of nearly the whole party, which put an abrupt termination to their proceedings, and compelled them to disperse and seek for safety in a more healthy climate.

Now it is very clear, that, by the exercise of a little discretion and forethought, proper stations might have been selected, whence the observations could have been carried on according to the season with perfect safety, and, by changing place to the islands or to the elevated grounds during the worst period, examining the pestilential marshes at the proper time, better results would have been obtained, and the parties engaged saved from carrying, as we have no doubt some of them will, the remembrance of this improvident arrangement to premature graves.

The narrative, which occupies the first volume, is drawn up by M. Bory de St Vincent. In some parts the more remarkable animals they met with are mentioned, but in general it is entirely personal,

containing the admixture of slight and superficial notices of the pastoral and agricultural inhabitants of the country. We were not surprised to find their testimony respecting these people more favourable than might have been expected from the reputation the Greeks have acquired at Smyrna, Constantinople, and other trading places, where the most disadvantageous comparisons are generally made between them and their former barbarian masters. In other respects, the drawing up of this narrative gives no very favourable opinion either of the liberality or knowledge of the author, on certain subjects he has the bad taste to introduce or rather parade before his readers. He appears to be of that class of his countrymen who labour under what may be termed, "anglophobia," which became prevalent in the time of the empire, having succeeded to the "anglomanie" of the period prior to the revolution, and is so prevalent at present, notwithstanding the friendly terms we are on, that every candidate for public favour must make his profession of it, or be purified, according to the Spanish phrase, of any tendency to the older disease,—and we doubt not this seasoning of anglophobia one cause for this volume running to a second edition, as we understand it has, the merits of the book itself being very small. The writer gives very unequivocal proof of his being of the modern school. He deplores, in a way to leave no doubt of his sincerity, the national arms being employed in concert with those of England. Every rock seems to suggest visions of occupation, and of goblins in the shape of British sailors and marines taking permanent possession of them;—a strange commentary on the proceedings of his countrymen on the opposite coast of Africa!

In one instance he travels quite out of his way, in speaking of the Greek Priests, to introduce an observation on our manners, which, if it were founded on fact, would be totally misplaced in his work; but happening to be quite the reverse, it shews not only the animus which dictated the insertion of it, but the utter ignorance as well as low and vulgar prejudices of the author. These observations may appear to be unnecessary here, and foreign to the subject we are writing on; but they are by no means so. We are speaking of a public body, the elite of one of the leading members of the great republic of science, and it is not unimportant to notice the spirit in which these reports, which are in fact public property, are conducted. Independently of this there are other reasons. The same narrow and contracted views which have caused the introduction of these topics where they are quite uncalled for, infect various parts of the

body of the work itself. There is too visible a tendency to assume airs of exclusive intelligence, and reduce everything to the petty scale of the little circle or clique which were brought together. "Nous," "un de nous," &c. occur rather too often, whilst the works of others, which might have assisted them, are either unnoticed, or mentioned so slightly, that it would appear to be the result of force, rather than from that general republican feeling which ought to animate those who hold prominent situations in the scientific body. We regret any tendency to this failing the more, from seeing its effect on our own literary and scientific societies, the tendency in which this evil is so strong, and the difficulty so great, of avoiding the forming petty oligarchies, with their moment of splendour, followed by stagnation, twaddle and decay. It will be a real loss to the world, if this spirit (as it is beginning to be thought,) seize on the French; but to themselves it will be still heavier, for it will entail the certain falling from the "high estate" to which the great men who have lately departed had raised them. The lead once lost will not easily be regained. Of the littleness we complain of, one of the common forms is the fear of being "devance," and the carefully abstaining from any connection of the observations made by others in the corresponding zone of Europe, which, especially those on Italy and Dalmatia, might have been introduced in a work of this sort, where some general views of science might have been looked for, as well as the more isolated facts which came to their knowledge. As, however, this appears not to have entered into the speculation of MM. de la Commission, we shall proceed to analyse the information which they have presented to us.

Mammalia.—It would seem incredible that of the bats we should only have V. murinus and pipistrellus mentioned. In a country like Greece, which abounds in caverns and retreats suited to the genus, we looked for a very different result. The very treasuries of Atreus and Merigas, or the walls of Messene and the vaults of Megarpelia might have been ransacked, to extend the scanty list, in forming which we fear little attention has been paid.

Traces of moles were observed, especially in the elevated table-lands which form the centre of the Morea, but the species was not made out. It is most probably the Aspalax or T. cœca of Savi. They are said to disappear during summer,—no doubt retiring to the marshes or to the depths of the shady forests, where the soil is easier to work, and the food more abundant, than in the open grounds, which become indurated with the rays of the burning sun.

The wild-cat, F. catus? is extremely common, especially in the cen-

tral parts of the Morea, where they prey chiefly on partridges; but at some seasons they approach the isolated houses and seize the poultry. The species is said to resemble that of the centre of Europe, but in some degree to assimilate to one figured in the voyage of Belanger to the East Indies, and called Felis rubiginosa, which they say has spots on the breast and sides. We have carefully examined both the plates, which are quite unlike each other. The cat of Belanger is so badly represented that it is necessary to be told what animal it is meant to represent, and considerable doubts exist as to its being a genuine species, or more than the common cat of Madagascar.

The plate in the present work is much better, and is totally different from the other. From the looseness of the description, we are disposed to think that no very great attention has been paid to the subject, and that the true species of the Morea remains to be more accurately described. We have a strong suspicion that it may turn out to be identical with a cat seen by the writer of this notice, in the Sierra de Cuenca in Spain. This species, of which he has only seen the individual specimen on which the observation was made, differs totally from that of the north and centre of Europe. The fur was reddish, like some of the lynxes of the Alps, the back and head broadly striped, and the tail barred with black. The greatest peculiarity was in the ears, which were short and rounded, as if they had been clipped, and they scarcely stood above the fur. The head was round and the muzzle short, unlike the lynx and caracal, and the animal was possessed of very great strength.

The zones or parallel of these localities nearly correspond with each other, and it is very probable, when a more accurate account is given of the cat of the Peloponnesus, that it may turn out to be similar to that of Cuenca—respecting which we have written to Spain, and hope, when the country is in a more tranquil state, to have some further account.

The lynx is not uncommon, and it is protected by the prejudices of the people, who believe that it is the deadly foe of the wolf, and assists in defending their flocks! Most probably this popular error proceeds from their being seen engaged in conflict, to defend the prey they had taken, which the stronger and equally rapacious brute was desirous of appropriating to itself. We are left in ignorance of the species, from which it may be inferred that it is the common lynx of the centre and north of Europe. We should rather have expected to hear of the spotted variety, which we found to abound in the Sierra Morena, Felis pardina, or a variety of it? This, the most beautiful

of the European quadrupeds, we have not seen in any collection. A skin very nearly entire was sent by the writer to the British Museum, but, not having been properly cured before it came into his possession, was destroyed in setting up. There can be little doubt, that if it be not found in the Morea, it may be looked for in the larger islands of the southern Archipelago.

The wolf is very numerous, and were it not for the celebrated breed of Molossian dogs, which have lost none of their qualities, would render the keeping flocks of sheep extremely difficult.

The fox is very common in the Peloponnesus, as may be expected in a country of mountain fastnesses, and of forest and wooded ravines so well adapted to their habits. The species is not given, but they suppose it to be the same with that which inhabits the centre of Europe. We rather suppose, on the contrary, that this was not ascertained, owing to their being probably ignorant of the discovery of the Prince of Musignano, and that the Grecian fox is the C. melanogaster, or short-footed species, of that naturalist.

The most important discovery made amongst the Mammalia by the Commission was that of the jackal, C. aureus, which not only inhabits the Morea, but is extremely abundant there. On one occasion their yelpings at night put the little camp on the alert, and they stood to arms as if expecting an attack. We are told this quite gravely; and we cannot help contrasting the restless vigilance of our neighbours, bordering on timidity, which is a quality so valuable in war both by sea and land, with the habits of our own countrymen, in whom it is almost wholly wanting, often to the great prejudice of our arms; and when once composed, we engage that a party of John Bull's family would require a much stronger stimulus to rouse them from their slumbers.

We confess feeling rather a sense of humiliation, that, after the hordes of travellers we have sent annually, fit and unfit, to travel in Greece for the last twenty-five years, the curious fact of the existence of the animal should have been left to the discovery of these gentlemen in 1829.

We have a disquisition on the species, which it appears has engaged the attention of F. Cuvier, who has made out the following varieties: Caucasian, Nubian, Senegal, Algiers, and that of the Morea. As the distinctions of those of Algiers, Caucasus, and the Morea, appear to be founded wholly on the colour, or rather shades of colour and length of fur, we are not disposed to concur in them, as the influence of season, of age, or climate, will no doubt account for the appa-

rent differences, especially as the observations can only be made on a comparatively small number of individuals.

The case is different with the species of Nubia, which is probably identical with that of Senegal. The skin is spotted, and the ears are longer than in the northern race.

We are now favoured with a curious observation suggested by this peculiarity in the ears of the Nubian species. We are told that the elongation is common, not only to the quadrupeds which inhabit the vicinity of the Zahara, or great desert, but to man also, and that the Bedouins, who belong to it, have the conch of the ear singularly long, differing from that in other races. We confess we were a little startled at the intelligence. Our first idea was, whether, if the being born about the Zahara imparted such a peculiarity, the sojourning some time in the vicinity might not be followed by some elongation of the same part. Not finding, however, that this was the case, and knowing that the Moorish Spaniards, whose ancestors came from the region in question, have remarkably small ears, unless, indeed, that proceeded from their being removed from the locality, our thoughts then turned very naturally to our old acquaintance Pan, and the Fauns with their auricular appendages. According to this theory, instead of being natives of Mount Taygetus and Arcadia, their pedigree ought rather to be Numidian or Mauritanian. We wish the Commission had discussed the subject in the part of their work which is dedicated to the ancient animals of the Peloponnesus; and we strongly recommend the consideration of it to that portion of the Parisian savans, who devote many sittings to the affinities of the genus homo with some of the quadrumana. It might afford an interesting variety to these lectures, of which the auditory begin very naturally to complain.

This fact, if established, might be of considerable use in assisting the reform now carrying on so resolutely in the Ottoman dominions. It is known to those who have been in the East, or have attended to their peculiar method of conducting a government, that the common mode of announcing a victory, before the introduction of gazettes and bulletins, which are now coming into use, was by the arrival of Tartars or couriers with sacks full of the ears of the vanquished, which were pickled in salt. The heads, which ought to have been sent, being too heavy for transport, this lighter substitute was found. Now it has happened not unfrequently, that, in a scarcity of the article,—or from the battle being of the nature of those in Spain, where it is difficult to say which party is the conqueror, or rather who has lost the least, excepting in ammunition and shoe-leather,—that a habit has prevailed

of filling the bags at the expense of the rayas or infidel inhabitants, especially the Jews of the towns in the line of march, who were called on to make up the deficiency. In case of operations being carried on in any of the parts in which this conformation existed, it would have afforded an excellent means, by keeping the measurements of the ears of the respective tribes, to check the accounts and statements of the pachas, and be the means of preventing innocent and guilty being placed in the same situation, as was too often the case.

The Commission are too generous to deprive the author of this speculation of the merit justly his due. It is stated to proceed from "un de nos consuls generaux." However lightly we may be inclined to treat this lucubration of the worthy consul, we cannot but applaud the zeal which has induced him to attend to such subjects, and we wish him success in his future communications. We only wish we had similar instances to report from our consular and diplomatic bodies, who are, with some exceptions, singularly deficient in imparting information on such subjects.

One more observation on the jackal of the Morea. Are we to consider them of the early inhabitants, prior to the first civilization, and contemporary of the lions and other larger feræ, which we have historical testimony to bear out the belief, that they did really inhabit the Peloponnesus? or may they not have followed the train of the Asiatic hordes, who at various times have crossed the Bosphorus or the Hellespont under Xerxes and others? Leaving out the possibility of their crossing by the bridge of that monarch, it is by no means a rash supposition, that the abundant provender to be obtained by following such bodies of men would impel animals to make an unusual exertion, in order to keep in a train so advantageous, and the swimming the Hellespont is quite within the power of such a quadruped as the jackal. We have seen the shoals of sharks, one of which was accustomed to follow each Guinea or slave-ship to the West Indies from the coast of Africa, at the time that trade was permitted, impelled by a similar motive. It is possible this may be the origin of the present breed of jackals; but we should rather incline to the belief that they were aboriginal, and co-existent with the Nemæan lion and the Erymanthian boar, both which races have disappeared, and that, by retreating to the fastnesses of Taygetus, or of Pindus and Parnassus, they lived in seclusion during the period of civilization, and escaped the extermination in which the larger feræ were involved,—advancing again by natural progression, as the Turks

reduced the country to a state more congenial to their habits, and fitted to encourage their propagation.

Birds.—The catalogue of birds is extremely scanty, consisting of only 66 species, without any pretension to novelty. We should be inclined to say MM. de la Commission, What have you been about? In fact, it would seem incredible that such a list should be the production of so much time and labour. We could be almost tempted to furnish a supplementary list of those we know *must* be there, or which, from some cause or other, have been overlooked. Our countryman, Mr Strickland has, we believe, at least found one new Sylvia, and has done more than the Grecian Institute.

A good plate is given of the Falco tinnunculoides, which, until very recently, was, and still is, extremely rare in collections. (We believe the first seen in this country were those brought from Spain by the writer of this notice.) They claim the merit, we believe due, of giving the first good representation of the most beautiful of the smaller eagles, as the Falco Bonelli, when in full plumage, is unrivalled amongst the larger of the genus of the European Falconidæ.

We have long been aware of this bird being common in Greece, from the circumstance of first seeing a number of them blown off by a gale from the Acroceraunian mountains several years since, during the war, when they were captured at sea. The writer of the ornithological report asserts that it is unknown in the west of Europe! Yet they inform us in another place, that one of the party had been at Seville, where they swarm, as they do in all the cities of the south of Spain, and are seen as far north as Toledo. We do not despair, if our Hibernian brethren, who are at last in the field, and will look vigilantly out, of adding this and other interesting birds to the British fauna.

A very moderate flight to a bird accustomed, as this is, to remain the whole day on the wing, would waft them from the western coasts of the Peninsula to the nearest part of Ireland. We particularly recommend the attention of the writer of the notice on the Irish birds in the late number of this Journal to the subject, and especially to those which are mentioned as breeding about the steeples of churches.

We wish steps were taken to naturalize these beautiful birds, which we have no doubt would easily live in the south of England. They are quite harmless, live on beetles and other insects, occasionally take a mouse or mole, and would be highly ornamental in such situations as Exeter or Salisbury cathedrals. They can easily be procured

at Seville by means of the keeper of the Giralda, who has access to their nests.

The Strix bubo and Vultur fulvus were met with, but we are not informed whether the former be of the common species of the north, or of a supposed variety which is assigned to the zone of these observations.

If the list of birds be scanty, to make amends we have a new arrangement of the Passeres, and a fresh coinage of names with which M. Geoffroy has favoured his friends and the public.

The partridge of the Morea is said to be the P. rufa, contrary to our belief that it is the P. Græca or Bartavelle. Probably both species may occur, and it is pretty certain that the P. petrosa will be found to be the prevailing species in some of the southern islands.

The beautiful Poule Sultane, or purple water hen of Latham, Porphyrio hyacinthus, was found in the marshes near Navarino, the plains of Helos, and other localities. It is probably more numerous than it is supposed to be, if the habits resemble those of the species in Sardinia, where they frequent the most infected parts of the marshes, which are almost inaccessible during the heats of summer.

We strongly recommend to our friends of the new society in St James's Park to take steps for the introduction of this most lovely bird. We were informed by the late Professor Bonelli, that they are abundantly kept in the yards of houses at Catania in Sicily, as they were in the time of the Romans. They live easily in a domestic state, and would only require protection from the winter's cold in this country. Independently of their beauty of plumage, which resembles the finest tints of the tropical birds, their habits of using the long prehensile toes to lift their food gives them a peculiarly elegant appearance.

Reptiles.—The Testudo emarginata abounds in the Morea, as does the T. Græca, which is common in Sicily, Calabria, &c.

The Testudo Europa (Gray,) which inhabits the marshes of the south of Europe, was found abundantly at the mouth of the Eurotas.

A new species is given under the name of C. Hellenica. It was found in the ditches which drain the plain of Nisi, in the heart of Messenia. It appears to differ from its congener, by the form being less elliptical, the sides more rectilinear and elongated. Some were observed to be even less than rectilinear, and to be slightly concave on the sides. There are also some minor points of difference.

Emys Caspica (Gmelin) is common in the shallow streams of the Morea, and in those of the Isle of Tenos.

We have thus a respectable addition to our scanty knowledge of these reptiles. There is little doubt that the aquatic species could very easily be naturalised in our streams and artificial waters of the south and west of England, where there is depth to enable them to secure themselves against the winter's cold. They are perfectly innocuous in every respect, and as the steam-boats which now traverse the Mediterranean in all directions give great facility for their transport, they would form an interesting appendage to them. We cannot speak from personal knowledge as to their fitness for the table, never having tasted them, but we have heard that one of the terrestrial species, probably T. Græca, formed a favourite item in the Lent fare of the luxurious inhabitants of the wealthier convents in the south of Italy, before their suppression at the time of the French invasion. Our informant complained only of their highly stimulating and nutritious properties, which ought to have made the worthy monks cautious in the use of them.

Amongst the Saurians, a new lizard, under the name of L. Pelopennesiæa, is introduced. It is nearly allied to Lacerta muralis, the green lizard of the south of Europe, but the palatal teeth are wanting, and the lateral parts of the head behind the eyes are said to differ, the scales being nearly equal and polygonal, without the large central scale, as in the neighbouring species. It was found in the Morea and in the islands with L. muralis, but is less common.

We should scarcely, after the description which is given, expect to find the animal represented as almost wholly bright green, but so the artist has turned it out. It is so managed that the very spots or blotches meant to represent "noirâtres," look like deeper tints of the same colour. This inattention is inexcusable, otherwise the plates, especially that of S. muralis, are beautiful.

Another new saurian is given as Algyroides Moreoticus, being of a genus established by MM. Dumeril and Bibron to distinguish it from Algyras, owing to some slight difference discovered in the scales. It is a small but very beautiful species.

The Stenodactylus guttatus of Cuvier, (Agame ponctuée of the great work on Egypt, and hitherto not observed out of that country,) was found in some part of Greece, but the locality is not given, which we would much rather had been the case. Its congener, the S. vermiculatus, which is common in the south of Europe, was found at Modon, Argos, &c.

The Ablepharis, Kitaibelii of Cocteau, a congener, which had only been seen in Hungary, was also observed. The form is longer and more taper than that of the adjoining species.

The Pseudopus Pallasii, the Scheltopusik of the south of Russia, was found to be common in the Peloponnesus. This curious genus, of which we owe the discovery to Pallas, and probably has not been seen by many of our readers, is a serpent with a long finny membrane on each side upon the under part of the body, which makes it a connecting link between the lizard and snakes. The first which was seen was basking in the vernal sun after emerging from its winter retreat, and was demolished instantly by our naturalists with the but of their guns; and they were surprised on examination to find it had no fangs, and was consequently not venomous, reminding us of the youthful zeal with which we used to attack the poor Anguis fragilis or slow-worm, when it unfortunately came in our way.

Many were subsequently taken, and were more mildly dealt with, being kept alive about the houses in a half domestic state, to which their mild and inoffensive manners enabled them to accommodate themselves. Their powers of digestion must be considerable, for we find the principal diet offered to them was hard boiled eggs, reminding us again of the practice of our younger days, as if animals in a domestic state should be given the food most unlike that of their natural habits. On one occasion, however, a pseudopus met with a nest of young unfledged birds, which it soon demolished, and we have no doubt fully enjoyed. The plate is good, the colour being more russet and less green than that of the Prince Musignano, probably owing to some difference in age or sex, or from the animal being more recently killed than that figured in the Iconographia Romana.

Another species is given as new under the name of P. Durvillii. It is much smaller, and is striped and varied in colour. We cannot help thinking it possible that it may be the young of the preceding species.

An Anguis or slow-worm, on which the name of A. punctuatissimus has been conferred, seems to possess unequivocal claims to novelty, the muzzle being narrower, the arrangement of the cephalic plates and the disposition of colour differing from the common A. fragilis. The upper part of the body is "cafe au lait;" underneath it is grey, and the whole dotted with very small black specks, forming longitudinal lines round the body.

Serpents.—A small yellow reptile, the Typhlops flavescens of

these writers, was met with in the islands of the Archipelago. In form it would appear to resemble Anguis, but it is placed amongst the true serpents.

The Erix jaculus, Daudin, the Erix of the Delta in the great work on Egypt, a small harmless species, was found in the islands of Saxos and Tenos.

The Coluber siculus of Cuvier, which was named after specimens brought from Sicily by Bibron, is common in the Morea, and a species so nearly resembling it as probably to be identical, but which is called Coluber bilineatus, is also figured. Both these, if they be two species, are very nearly allied to C. natrix. The beautiful C. leopardinus is also given, but the plate is not equal to that of the Prince Musignano, who, they complain, preceded them owing to the delay of the engravers.

The Coluber cucullatus of the great work on Egypt, which was not known to exist in Europe, is given as found in Greece, but unfortunately we have no locality assigned to it.

The common and indeed only viper, according to these gentlemen, is the C. ammodytes or snouted species. It is very common, and the activity of its poison produces frequent accidents. The length is not great, the largest only measuring from 15 to 18 inches in length, but they are said to be very thick, a proportion which has not been observed by the draftsman.

The Bufo palmarum, so called from its habit of seeking shelter under the palmetes, is nearly of the same dimensions as the B. agua of America. The largest known of the genus has hitherto only been found in Sicily and in the Morea. Some individuals measured from the nose to the extremity of the hind feet 40 centimetres, nearly half a yard. The colour is dark yellow brown, and the appearance extremely disgusting.

A good plate is given of the B. viridis, a beautiful species, if the idea of beauty can be attached to a frog. It was found in the ditches of the fortress of Modon.

The extent to which this notice has been carried prevents our noticing the sections of Fish, Insects, and Botany, &c. which we reserve for a future occasion.

Bibliographical Notices.

A History of British Birds. By William Yarrell, F. L. S., Secretary to the Zoological Society. Illustrated by a Wood-cut of each Species, and numerous Vignettes. London, Van Voorst, 1837. 8vo. Nos. I. II.

We merely announce the appearance of these numbers as the commencement of another department of a valuable series of works devoted to the Natural History of the British islands, and bringing down our information to the latest date. When the work has reached its completion, we shall endeavour fully to review its contents. The present numbers are published nearly in the same beautiful style of workmanship with their author's Fishes and Mr Bell's Quadrupeds. The descriptions are concise and faithful, and contain all that is at present known of the birds. The execution of the wood-cutting is in general beautiful; but we do not like the drawing of many of the birds. Some of the figures are stiff and not artist-like; as examples we may mention those of the Neophron and white-tailed eagle, and as a contrast we would refer to the finely wrought figure of the jer-falcon.

The Birds of Australia and the adjacent Islands. By John Gould, F. L. S. Part I. Folio. 1837.

Icones Avium, or Figures and Descriptions of New and interesting Birds from various parts of the Globe. By John Gould, F. L. S. Forming a Supplement to his former works. Part I. Folio. 1837.

The two works of which we have now given the titles have been sent to us by their indefatigable author. If carried through in their present manner, they will be invaluable to the ornithologist; and from the materials which Mr Gould can call to his assistance, and the talents as an artist possessed by his lady, we could not wish the subjects to have been placed under a better charge. The birds of Europe being now completed, ample time can be devoted to these additional undertakings.

The first work contains figures and concise descriptions of ten birds from Australia,—*Malurus Lambertii* and *elegans*, the latter a closely allied but distinct species; *Calodera maculata*; *Amadina ruficauda*; *Nanodes undulatus*; *Nymphicus Novæ-Hollandiæ*; *Nestor productus*; *Hemipodius melanogaster*; *Leptorhynchus pectoralis*, a curious bird intermediate in form between Himantopus and the

avosets, and *Phalacracorax punctatus*, a cormorant of gray and white plumage, and orange-coloured legs and feet.

The "Icones" contain *Eurylaimus Dalhousiæ*, of which Mr Gould has formed a subgenus, *Crossodera*. Mr Swainson, in his Synopsis of Genera, given in Lardner's Cyclopædia, has also thought this necessary, and has named the former *Psarisomus*, from its "*supposed*" resemblance to a Psaris. We are not sure which of these names has the right of priority, but we are sure that the bird in question has little resemblance to Psaris, and the bill appears to us to be as much developed in form as in the other green or gray tinted species from continental and alpine India,—*Todus multicolor*, described by Gould in the proceedings of the Zoological Society, and now we believe figured for the first time. We saw this species, in 1825, in M. Temminck's collection at Amsterdam.—*Ianthocincla phœnicea*, a beautiful and brightly-coloured species from alpine India.—*Calliope pectoralis*.—*Microura squamata*,—both from Himalaya.—*Paradoxornis flavirostris*.—See Mag. of Zool. and Bot. i. p. 64.—*Pteroglossus Gouldii*, a species from the Brazils, and named by M. Natterer in honour of our author.—*Numida vulturina*, Hardw. a very fine species from Western Africa.—*Ortyx plumifera*, one of the most beautiful species yet described. The head is adorned with two narrow feathers nearly three inches in length, forming a graceful bending crest. The other plumage is richly blended shades of gray, brown, and chestnut; and the bird is besides remarkable in shewing the character and markings of plumage which we perceive on the flanks of the red-legged partridges. Three specimens were procured in California by the late David Douglas.—*Cursorius rufus*, from the Indian islands, intermediate between C. Asiaticus and Temminckii.

Supplement to the Flora Metropolitana, or Botanical Rambles within thirty miles of London. By Daniel Cooper, A. L. S. 12mo. 1837. Highley, London.

A little work of 36 pages, giving localities which were omitted (or at the time of its publication undiscovered) from Mr Cooper's former volume, noticed at p. 281, Vol. i. of this Magazine. The greater portion of the pages is, however, occupied by a full index to the whole work, containing the English and scientific names, and indicating by contractions "the time of flowering, and colour of the flowers of the phænogamous plants." And, in conclusion, a short table is given of the elevations of the principal localities round London, above the level of the Thames, at Trinity high-water-mark.

Similar tables would be very desirable were they appended to the more extended Floras which we have of various districts both in England and Scotland, and also, according to Mr C. Watson's plan, to note the ranges of elevation between which the plants are seen to occur.—The greatest height within the limits of Mr Cooper's Flora is Leith-Hill, 993 feet. The lowest is Kensington Palace, 66 feet, 1 inch.

PERIODICALS—*British.*

Loudon's Magazine of Natural History. New Series. July and August 1837. (Continued from page 276.)

I. *Zoology.*

On Nomenclature by Zetetes, p. 421.——EYTON upon the Theory of Hybridity, p. 357.——TEMPLETON's List of the Irish Vertebrate animals, p. 403.——Dr MOORE on the Web-footed Birds of Devonshire, p. 360.——Observations on Woodcocks and Fieldfares breeding in Scotland, by GEORGE FAIRHOLME, p. 337, with remarks on the same subject, by Mr E. BLYTH, p. 439.——On the structure of the Fossil Saurians, from the German of HERMANN VON MEGER, p. 341.——Report of a Notice, by M. Rang, respecting the Inhabitant of the Argonaut, by MM. DUMERIL and De BLAINVILLE, p. 393.——Some observations on Mr Stutchbury's proposed new genus of univalve shells Cyprædassis, by G. B. SOWERBY, p. 366 and p. 431. Could not Mr Stutchbury's views of a genus in Malacology be controverted without the infusion of acrimony which embitters this paper? In his "additional remarks," Mr Sowerby declares that he is not actuated by any personal feeling against his opponent,—so that he seems to have had no reason whatever for having stated his objections in the first instance in an irritating and insulting manner, for assuredly there is no expression in the original paper of Mr Stutchbury, which could provoke such a bilious discharge. We do indeed very heartily wish that our metropolitan brethren would cultivate a greater "sweetness of speech," for their animosities and mutual recriminations afford no sport to us, and do not tend to edifying.——On the Mactradæ, by J. E. GRAY. p. 370.——Among the short communications we find, Notice of the South African Museum: Additions to the Zoological Society: the Fossil remains of Apes: on the Habits of the Viper: on the swimming of snakes: on the alleged affinity between the Pigeons and Poultry: Eagle's nest in Loch Skene: Ventriloquism in Birds.

II. *Botany.*

The communications under this head are limited to a few short notices. 1. On *Lamium intermedium*, and 2. *Fedia carinata*, by Mr Leighton: 3. On *Alyssum calycinum*, and 4. *Leucojum vernum* by Mr. Brown. It would appear not improbable, from a note of Mr Brown's in p. 447, that the *Betula intermedia* is a native on the Clova hills, where it has been mistaken for *B. alba*. The point is deserving the attention of our Scottish friends.

Companion to the Botanical Magazine. By Sir W. J. Hooker, Professor of Botany in the University of Glasgow. (Continued from p. 276. Vol. ii.)

This Number (the 24th of the work) completes the second volume; and as we have received our August and September numbers of the Magazine, but without its worthy "Companion," we feel somewhat uneasy, and sincerely trust that it has not altogether ceased, for want of encouragement and support.

The contents of the number are, Notes upon some genera and species of South American Orchideæ, by John Lindley, Ph.D. F. R. S. ——Chrysorhoe, a new genus of Chamælaucieæ, by the same author.——Floræ Insularum Novæ Zelandiæ precursor; or a specimen of the Botany of the Islands of New Zealand, by Allan Cunningham, continued from last number, contains the Hepaticæ, Lycopodiaceæ, the Felices veræ, and a portion of the Plantæ vasculares. Two figures of Loxoma Cunninghamii, a new species belonging to the Polypodiaceæ, are given; the one, illustrating the fructification, is beautifully executed by F. Bauer.——Botanical information contains a list of the species figured in the two last parts of the "Icones Plantarum."——Some remarks by Dr Wright, copied from the Madras Journal of Literature and Science, relative to the descriptions of Dr Graham, from Colonel Walker's specimens. Dr Wright leaves the matter of the identity of the plants still uncertain, but is of opinion that Dr Graham's plants have been introduced to the Island of Ceylon, and are not indigenous.

Periodicals—*Foreign.*

Annales des Sciences Naturelles. Zoologie, MM. Audouin et Milne-Edwards. *Botanique*, MM. Ad. Brongniart et Guillemin. Crochard and Co. Paris, Janvier 1837.

I. *Zoology.*

Recherches sur quelques Entozoaires et larves parasites des insectes Orthoptères et Hyménoptères, par Leon Dufour.——Professor

Vrolik *sur les dents incisives et le nombre des côtes du Rhinoceros Africain.*——*Observations preliminaires sur l'existence d'Infusoires fossiles et sur leur profusion dans la nature*, par M. Ehrenberg.——*Etudes pour servir à l'histoire naturelle des Myriapodes*, par M. P. Gervais. He has ascertained that the eyes of the Juli, Lithobii, and Scolopendræ increase in number with the growth of the individual.——*Synopsis des genres et des espèces d'animaux fossiles decouverts dans les couches superieures des depots tertiaires des montagnes Sivalek de l'Himalaya*, par MM. Cautley et Falconer.——Baker *sur le Chameau fossile du Sub-Himalaya.* This and the preceding are translations from the Journal of the Asiatic Society.——*Note sur les organes respiratoires des Capricornes*, par M. Pictet.

II. *Botany.*

Notice historique sur Ant.-Laur. de Jussieu, par M. Ad. Brongniart. (See a translation of this paper in our present Number.)——*Note historique sur ce que l'on a écrit en France de* 1806 *à* 1816 *sur les mots* conducteurs *et* cordons pistillaires, *par* M. A. de Saint-Hilaire.——*Note sur le genre* Stephanotis, *de la famille des Asclépiadées, par* M. Ad. Brongniart.——*Description du nouveau genre Archimedea, par feu la* P. Leandro do Sacramento, *précédée d'une notice sur ce botaniste, par* M. Aug. de Saint-Hilaire.——*Note sur le genre* Polycnemum *et sur une nouvelle tribu de la famille des Paronychiées, par* A. Moquin-Tandon.——*Essai sur la disposition des feuilles curvisériées*, par MM. Bravais.

Magazin de Zoologie, Journal destiné à etablir une correspondence entre les Zoologistes de tous les pays, et à leur faciliter les Moyens de publier les espèces nouvelles ou peu connues qu'ils possèdent. Par F. E. Guerin-Meneville. 8vo. Paris, 1836. Sixième année.

This periodical has now been continued for six years, the last or sixth volume having been completed with the year 1836. The entire work is devoted to every branch of zoology, but the subjects are arranged in classes, which can be subscribed for separately, according to the taste and pursuits of individuals. The plan of the work appears, from the prospectus and volume before us, to be restricted to descriptions of what may be considered new species, the information and figures being sometimes taken from contemporary works, and to monographs and memoirs of particular families or genera. No reviews or notices of new works, and no general information regarding the progress of zoology, are given.

Among the Mammalia described, we have a description and figure of the beautiful Colobus Guereza, taken from the " Neue Wirbelthiere" of Rüppel.—A notice of some of the animals brought home by " La Corvette La Favorite," and a short memoir, " Sur le genre *Pæphagomys* et quelques autres Rongeurs qui l'avoisinent," accompanied by a figure of P. ater, and a good plate of the dentition of *Oryctomys*, Blain.

The ornithological department commences with descriptions of some of the birds discovered by the expedition of " La Favorite," by MM. Fortune Eydoux and Paul Gervais. A figure of Gould's Pteroglossus ulocomus is given. The specimen was procured at Para, and is said to be the only one in the Parisian collections. An Ibis is presented under the title of I. Lamellicollis, sent from New Holland, and so named by M. Lafresnaye, but this is the New Holland Ibis of Dr Latham, the *I. spinicollis* of Jameson, New Ed. Phil. Journal; and the I. Lathamii, Gray, Proceed. Zool. Society of London.—The same gentleman figures and describes a shrike as new, and lately sent from the Cape of Good Hope, by M. Verreaux, under the title of *L. melanoleucus*.—How he has hit on the same title we know not, but a plate and description will be found executed and published six or seven years since in Illustrations of Ornithology by Sir W. Jardine and P. J. Selby, from specimens sent to Europe by Dr Smith. A curious bird from Madagascar, of which a new genus is made, *(Falculia,)* is figured and fully described. The form is considered to be intermediate between the hoopoes and Promerops of Temminck, and the colouring is peculiar, the head, neck, and under parts pure white, the remaining plumage deep bluish-black. A short memoir by M. Lafresnaye on the species of the genus *Orthotomus* of Horsfield.——Remarks by the same person on the genus *Certhilauda*, Sw. with observations on two South American species, which are considered to be new, and a beautiful *Micropagon* from South Africa, or rather from the interior of the country, said to have been brought from the country of the " Masilikats." M. Lafresnaye has named it *M. sulphuratus*.

Mollusca. Plate 71 represents *Drepanostoma nautiliformis*, the type of a subgenus of Helix distinguished by a peculiarity in the shape of the aperture which the name (from δρεπανον, a scythe, and στομα, a mouth,) is meant to express. The species is a native of the province of Como in Italy, living in families under stones and decaying leaves in shady woods.——The *Rostellaria occidentalis* of Beck forms the subject of Pl. 72. It belongs to the same section as our British species; and is a native of the North Ame-

rican coast, and, it would appear, of the Greenland shores also.——*Marginella Cleryi*, figured in Pl. 73, is allied to M. Adansonii, from which, however, it is well distinguished: it inhabits the coast of Senegal.——*Helix Poeyi*, from the interior of the island of Cuba, occupies Pl. 74, but the shell only is given.——This is followed by Webb and Vanbeneden's notice *sur les mollusques du genre* PARMACELLA, *et description d'une nouvelle espèce de ce genre*,—a valuable paper which we have already noticed, Vol. i. p. 492. Two plates, one zoological and one anatomical, are devoted to its illustration.——*Note sur deux espèces nouvelles d'Aplysies, par* MM. VANBENEDEN et WEBB. These fine species were procured from the shores near Nice. Their characters are:

1. A BRUGNATELLII, colore aurantiaco: alis parum elongatis; tentaculis posterioribus colore privatis, ore membranis duabus accessoriis lateralibus munito. Testa ovata, tenuissima, fragili, pellucida, striis concentricis eleganter notata. Rostro dextrum inclinato et in uncinam parvulam abeunte.—Long. 35 millim. larg de la coq. 12 millim.

2. A WEBBII, corpore limaciformi, virescente, maculis nigris flavisque ornato; alis palii parvis et partes testæ medias minime vestientibus; siphone fere nullo. Marginibus pedis anterius dilatatis; ore membranis accessoriis munito. Testa ovata elongata compressa, striis linearibus sculpta incisura ad dextram sinuata, rostroque bidentato.—Long. 25 millim. larg. de la coq. 15 millim.

CRUSTACEA.—The contributions to this class belong to its lower forms, and the species are all described by Guerin. The *Pterelas* is a new genus of the Isopodes, Fam. Cymothoades, nearly allied to Æga. The species is named *Pt. Webbii*, from the naturalist who procured it on the coast of Portugal.——*Description de quelques genres nouveaux de Crustacés appartenant à la famille des Hypérines.* The genera are *Primno*, nearly allied to Phronima, a native of the South American seas; *Hieraconyx*, which will stand in the system near to the Themisto; and *Pronoe*, near to Typhis. The paper contains besides descriptions of a new species of Phronima, viz. *Ph. atlantica*; and of the *Oxycephalus oceanicus*, a very curious animal from the shores of Chili.——The *Phlias serratus* delineated in pl. 19, forms a new genus of Amphipodes, affined to Amphitoe and Gammarus. M. Gaudichaud found this pretty little species on his passage from the Maldive islands to Port Jackson.——Pl. 14 represents a new oniscidous insect named *Deto echinata*, brought from the east by Olivier. It resembles in form our common Oniscus asellus.

Arachnida.—*Observations sur les aranéides du genre* Hersilia, *et description de deux espéces nouvelles appartenant à ce genre par* M. H. Lucas.——This is followed by a monograph of the genus *Pachyloscelis* by the same naturalist; who in pl. 15 describes a new species of *Attus* from the neighbourhood of Paris, named *A. venator*.

Insecta.—Plates 139 and 140 represent *Scarabæus Anubis*, a fine species allied to Scar. Typhon and Goliath from Brazil.——*Monographe du genre* Pamborus, *par* M. H. Gory, with figures of all the ascertained species.——*Notice sur les metamorphoses des coleopteres du genre* Telephorus, *par* E. Blanchard; and this lady contributes also a notice of the larva of *Staphylinus olens* in pl. 165. ——*Meloe collegialis* is described and figured by Audouin in pl. 169, a species with considerable marks of affinity to the M. excavatus of Leach.——*Carabus basilicus* from Porto-Rico, a very fine insect, occupies pl. 170, erroneously numbered 169 in the letter-press; and the genus Bryaxis is fully illustrated in pl. 171.

Radiata.—The only paper in this class is entitled *Recherches sur la cause ordinaire de la phosphorescence marine, et description du* Noctiluca miliaris, *par* M. Suriray, already noticed in our Vol. i. p. 491.*

* First part of a monograph on the *Trachydérides*, by M. Dupon Jeune, seems well and carefully done. Figures are given of the species, and 42 on 24 plates are now published. We shall recur to this memoir on its completion.

INTELLIGENCE.

ZOOLOGICAL.

Patella parva, Da Costa.—This shell, on the authority of Maton and Racket, has been considered synonymous with the *P. virginea* of Muller by all our recent writers. Dr Fleming threw out a hint that it may have been confounded on our shores with the *P. tessulata* of Muller, but he took no pains to ascertain the fact. My attention was first called to the point by the statement of Audouin and Milne-Edwards that the animal of the "Patelles roses" found in the English channel differed entirely in the structure of its branchiæ from the true Patellæ, and formed a new genus of pectinibranchous mollusca allied to the Turbines. (Hist. Nat. du Litt. de la France, i. p. 144.) Mr J. E. Gray informed me that these "Patelles roses" were the same as the *P. virginea* of our shores, but on examining these, I soon satisfied myself that those found on the coast of Berwickshire at least were formed like the Patella, the cloak of the animal being ciliated all round with a fringe of short equal filaments. The accuracy of this observation I have recently had occasion to confirm in company with my friend Mr J. Alder. It follows, therefore, that the shell usually called *Patella virginea* by British conchologists, is not that so named by Muller, but is probably his *P. tessulata*, in which the margin of the cloak is ciliated.

Is the *Patella pulchella* of Forbes in Loudon's Mag. Nat. Hist. Vol. viii. p. 591, fig. 61, a Patella or a Lottia?—G. J.

Zoology of Africa.—Our readers are by this time aware that Dr Andrew Smith has lately returned from an expedition undertaken to explore the interior of Southern Africa, and that he has brought to this country the whole of his collections in Natural History, which are now publicly exhibited in London. In the published catalogue of part of this collection there are the names of 62 mammalia, and 339 birds: there is besides an extensive series of drawings, MSS., &c. with other materials fully to illustrate the districts traversed; and in furtherance of his plan Dr Smith is about to commence printing a work to be entitled, "The Zoology of Southern Africa," embellished with highly finished plates, executed from the original drawings. On the authority of an individual on whose judgment we can rely, we are able to say that the materials are most valuable,

and the drawings full of character and interest. The Government has granted L. 1500 to assist in defraying the expenses of the publication. "In consequence of this," says the editor of the Magazine of Natural History, "an arrangement is being made with the intended publishers (Smith and Elder, Cornhill,) by which the public will obtain the work at one-fourth or fifth of the actual cost price, the Government grant defraying the whole expense of engraving the plates."

BOTANICAL.

Botanical Society of Edinburgh, May 11, 1837.—Professor Graham in the chair. The following members were elected:—*Resident,* Mrs Michael Percival, Mr Thomas Dickson, Mr James Hamilton, Mr James Nairne, Dr Silas Palmer, Mr George Trusted. *Non-Resident,* Mr J. S. Bowerbank, London; Mr Alfred White, London.

Specimens from Dr Salter were presented. Donation to library, "Pugillus Plantarum Indiæ Orientalis, composuit G. A. Walker-Arnott,"—from the Author.

Dr Balfour read some extracts from a letter from Mr Gardner, at present in Brazil, received along with the first invoice of Plants sent home by that gentleman.

Dr Balfour then read a communication on Botanical Prosody, in which he endeavoured to show that botanists in general did not pay sufficient attention to the proper pronunciation of the terms which they used. Whilst he allowed that in some cases the quantities of botanical names were arbitrary, he proved that in others these could be easily ascertained by a reference to classical authors; and in illustration of this, he adduced a number of instances, quoting the authority for a different pronunciation from that usually given to them.

A paper by Dr Walker-Arnott was read, containing observations on the British *Cichoraceæ,* with an arrangement of these according to the system adopted by Lessing in his "Synopsis Generum Compositarum." Dr Arnott expressed his belief that all our Floras would ere long follow Lessing's arrangement of the Compositæ, and adopt his generic characters, and for this reason strongly recommended the study of his Synopsis, along with the fifth volume of De Candolle's Prodromus, in order to obtain a competent knowledge of this difficult tribe, and the value of the different parts in generic characters. Various species of *Apargia, Leontodon, Hieracium,* and *Crepis* were especially noticed, and many interesting observations

were made upon these. In particular, it was shown that *Hieracium molle* being in all respects a *Crepis*, ought to be removed to that genus.

Mr James M'Nab exhibited a remarkable monstrosity of Spruce Fir from near Kettle in Fife; also *Petasites hybrida* from a station in the same neighbourhood, where it is apparently wild,—both found by Dr Howison.

June 8th.—Professor Graham in the chair. The following members were elected:—*Resident*, Mr Henry Barham Mitchell Harris, Mr Alexander Seton. *Non-Resident*, Mr John Ball, Christ's College, Cambridge.

Dr Graham presented from Lady Dalhousie a beautiful collection of Lycopodiums and Ferns, being the remainder of her Ladyship's East Indian Herbarium.

Dr Douglas Maclagan exhibited specimens of a root called *Hiarry*, received by him from Mr Watt, surgeon, Demerara, which is used by the natives of British Guiana for intoxicating fish. The botanical information regarding the plant was chiefly obtained from a slight sketch sent along with the roots; for no light had been thrown on the subject by consulting botanical works. The flowers are papilionaceous, light-purple, five or six on a lax raceme, the pod about the size of the common Laburnum, smooth, containing eight or nine seeds. The root, though dried, was found to retain the property of poisoning fishes; and a watery extract was ascertained by various experiments to produce on fishes nearly the same effect as Turkey Opium, and to be superior in activity to the extracts of Belladonna, Hyoscyamus, and Conium. A chemical examination of the root showed, that besides a large quantity of gum and colouring matter, it contained a resin of a light yellow colour and peculiar smell, and an acid differing in quality from any known acid,—but regarding the state of combination of which in the plant, no precise information had been obtained. One-fourth of a grain of this acid, obviously not in a state of purity, poisoned a minnow in half an hour. The effects of the *Hiarry* upon minnows, and comparative experiments with opium, were shown in presence of the Society, in which Dr Balfour, who read the paper in the absence of Dr Maclagan, was kindly assisted by Professor Christison.

Dr Graham exhibited specimens in flower of *Carex Buxbaumii* and *Lophospermum scandens*. He then stated, in reference to several species of *Bletia* lately obtained at the Botanic Garden, from Jamaica, through the kindness of the Rev. Mr Campbell, that an examination of these had satisfied him that the specific names in

this genus had been multiplied without due attention to nature. In particular, he believed that *Bletia florida, B. verecunda, B. Shepherdii,* and he feared even *B. patula,* must be considered mere modifications of the same species. Specimens upon which this opinion was formed were exhibited. Dr Graham also exhibited a specimen in flower of *Philodendron crassinervium.* This plant had been introduced into the Botanical Garden, from Brazil, by Captain Graham sixteen years ago ; but though it had several times developed flower buds, the spatha had never till this season fully expanded, probably owing to the command of heat having been heretofore inadequate. —W. H. Campbell, *Sec.*

Glass eroded by a Lichen.—" Several pieces of glass were lately brought to me by a glazier in this city, taken from the old windows of an ancient church in the vicinity ; some of these had the appearance of being worm-eaten. Struck with the singularity of this, I immediately commenced an investigation of the circumstance, that I might ascertain by what agency this corrosion had been induced. Upon making a minute examination, I found it was caused by the instrumentality of a cryptogamic plant, I believe of the lichen species. The first indication of the plant was a greenish pulverulent mould on the surface of the glass ; in this substance some light-coloured brown dots appear ; these enlarge, and form cup-like substances of a slightly violet tinge ; these plants increase, and become fully developed. The glass is gradually acted upon, being first a little roughened and indented ; afterwards small cavities, some even penetrating a considerable distance into the substance of the glass, are formed.

" Not having read or heard of any plant having hitherto been discovered capable of decomposing and growing on and in the substance of glass, I thought it right to make a public communication of the fact through the medium of the pages of your valuable periodical, leaving it to other and abler naturalists and philosophers to disclose the kind of agency, whether chemical or galvanical, by which this singular decomposition of glass is effected.

" The glaziers of this city inform me, that glass similarly acted upon may be met with in the cathedral and old church windows." Thomas Hickes, Gloucester, April 25, 1837, in Med. Gazette for May 6.

Musci Angusiani, or Dried Specimens of the Mosses of Angus or Forfarshire.—This is the title of a work projected by Mr William Gardiner, Jun. of Dundee, of which a prospectus has been

sent us. "The work will be comprised in about *seven* or *eight* 12mo fasciculi—price 3s. 6d. each—forming *two* neat pocket volumes. On the left hand page of each leaf, one, two, or more specimens of a species will be carefully gummed, with the *scientific* and *English name*, reference to the page of the *British Flora* where the species is described, *locality*, and *time when found*,—all accurately written underneath. With the concluding fasciculus will be given, along with title-pages for both volumes, a printed table of the contents of each, arranged according to Sir W. J. Hooker's *British Flora*, and including a synopsis of the generic and specific characters. A blank will be left at the top of each page for numbering the species, and by means of the tables the specimens can be numbered and arranged with the greatest ease, while the numbers not being attached to them when published, will allow of any subscriber adopting whatever mode of arrangement he chooses, as well as of the author adding species that may be found during the publication of the work."

Northumberland Flora.—At the July meeting of the "Berwickshire Naturalist's Club," the members, in the course of their walk, discovered the *Asplenium septentriontale* growing in great profusion, on Kyloe crags, near Haggerston. The *Hieracium molle* was gathered in Kyloe dean; and the *Blyssmus rufus* abundantly in a salt marsh at the mouth of the Low below Beal. The two former plants are not included in Mr Winch's "Flora of Northumberland and Durham;" and for the latter, two localities only are given, both in the south of Durham. Dr Francis Douglas exhibited a specimen of *Cladium mariscus*, which he has discovered native in Learmouth Bogs, Northumberland, where, however, it is not plentiful, but a very interesting addition to the botany of the district. If to these we add Dr Johnston's discovery of *Cerastium atrovirens*, we have sufficient evidence that the zeal in the investigation of indigenous botany for which the northern botanists of England have been long noted, is not grown lukewarm.

Cerastium pedunculatum.—The explanation of the plate illustrative of this species having been omitted in its proper place, is here supplied. Plate VI., C. pedunculatum, var. β. 4-partitum. *a*, calyx with capsule of do. *b*, petal of the same. C. Fig. 1, calyx of Cer. tetrandrum: 2, a sepal much magnified so as to show the herbaceous point bordered by a pellucid membrane. D. Fig. 1, calyx of Cer. semidecandrum: 2, a sepal of the same much magnified so as to show the diaphanous margin and apex.

MISCELLANEOUS.

Seventh Meeting of the British Association for the Advancement of Science.

The Meeting of the British Association was arranged by previous agreement to be held this year at Liverpool, the general meetings to commence on Monday, 11th September. In the preceding week the preliminary arrangements were made by the Council and General Committee, while the town and corporation of Liverpool opened its institutions, and prepared accommodation on the most liberal scale for the various assemblies which were contemplated. The private institutions in the town, and the principal manufacturing establishments were also opened during the week of meeting; excellent and commodious rooms were allotted for the business and debates of each of the sections; and altogether, the proceedings of this year have been most important and satisfactory. Our particular department being connected with one section, we shall only now notice the proceedings in Zoology and Botany, but previously will offer one or two remarks on the manner in which some parts of the general business has been conducted.

The British Association has always had our warmest wishes for its success, and when circumstances permitted us to attend its meetings, we departed at their conclusion impressed with a feeling of deep regret that they had terminated, and that the friendly and scientific intercourse had so soon been broken off; we thought that it was an association which bid fair to extend the march of science, and would give an additional thirst for the acquirement of knowledge to many, who would not have been directed to any of its branches, simply because, what they had in reality to learn required to be pointed out; and where the direction of the subjects treated of, and the occasional lectures given, as at the present meeting with reference to the local application of science, the most important results might be expected. We are sure then, that, having expressed our opinion thus of the utility and importance of this great national assemblage, we shall not be thought as invidiously finding fault with any portion of its management, but that we wish to give the warning of a sincere well-wisher to a body which we would most anxiously cherish. At the same time, making the fullest allowance for occurrences which must take place to a certain extent, where the members are so numerous and the arrangements so multitudinous, there are one or two occurrences which we feel it would not be our duty to pass over in complete silence, particularly as we have seen that none of our periodicals have

ventured to notice them, but have drawn their reports only in the spirit of commendation.

Our first fault is with the manner in which the tickets of admission were distributed; far too much bustle and confusion prevailed in the rooms devoted for this purpose, and from half an hour to three quarters were spent before an individual could make his way through the crowd, and gain the presence of the Secretary; and by the irregularity of the manner in which those issued to the General Committee were marked, several gentlemen were subjected to the inconvenience of being refused admittance to meetings where *they* only had a right to be present. We know that Mr Taylor did his utmost in the rooms to prevent this, but, as the forms to be gone through had been previously arranged, it became no easy matter to keep things in order. The points which we think should be attended to at another meeting, and which we are sure our friends in Newcastle will amend, are the assistance of one or two additional clerks,—to dispense with so much signing and counter-signing, which prevailed at Liverpool before the ticket could be finally given,—and to make some separation between the tickets which are given to life members, and those which are only taken out on the occasion.

On Friday, which nearly terminated the debating meetings of the various sections, it was arranged that the President of each should deliver at the amphitheatre in the evening, a comprehensive report of the whole proceedings during the week,—an arrangement at once both useful and important, as laying before the public the manner in which the sections had been employed, and allowing it to judge of the importance of the subjects which had thus occupied them. These gentlemen or their delegates (for we regret to say that one or two were confined by indisposition,) certainly appeared when called on by the President, to deliver their reports; but, with the exception of Dr Faraday and Professor Henslow, we looked in vain for any thing in accordance with the task which had been entrusted to them. The gentlemen whom we have mentioned devoted their twenty-five minutes * to the reading of plain intelligible statements of the transactions of the week, giving a concise analysis of the most important papers, or offering remarks upon them, couched in simple and appropriate, yet eloquent and classical language. The exhibitions of the others were rambling discourses,—a lecture on the stethoscope, and a rant on the benefits which the Association would confer on a commercial community,—all totally foreign to the expected purpose; and

* From the time which the first specimen occupied, Lord Burlington allotted to each the space of twenty-five minutes.

where we saw that the dignity of well informed men was somewhat lost sight of in an attempt to make an impression on an audience, which they supposed were not all capable of following the drier or deeper points of science, which would necessarily require to have been treated of.

There is still another little failing of correctness of arrangement which we must notice,—fully convinced that, if such matters of little moment in themselves remain unchecked, they would in time inflict a wound which would often become irksome, and eventually refuse to be soothed by mild or ordinary treatment. On the platform erected for the evening meetings, and on which the General Committee or foreigners only have a right be present, a table has of necessity to be devoted for the accommodation of the President and the gentlemen officially connected with the meeting; around this we observed the scions of some noble houses regularly to take their seats, to the exclusion of some of the Presidents of the sections, and other officers who *might* have been called on in the course of business. We would always wish rank to assume its station, and rank with science combined has our highest homage; but it must be recollected that in these meetings the attainments of the individuals are the test of their distinction; and the office-bearers in the sections being elected as the most fitting persons to fill these honourable stations, their places should have been reserved during the short period they had been thus honoured by their fellow members. Let us entreat the Association to beware how they thus act again. Let the selection be made as rigorously as possible, but when it has been made, let the chosen officers be treated as such; at the same time, let rank and title have its highest and fullest influence. Hitherto we think the Association has acted most wisely. In the election of its Presidents, it has, in the first place, run through a list of names high famed for scientific acquirements; and latterly it has entered on a few whose names are alike noble for their rank, and for the manner in which the different branches of science have been prosecuted or patronized by them; and admiring the way in which this has hitherto been conducted, we have been the more particularly induced to make the preceding observations, feeling that if the least inroad is permitted either of this undue deference to men of high degree, or of the slightest taint of party or political bias, we must bid farewell to all our delight in these meetings, and to our anticipations of the great and extended utility which we at present think the BRITISH ASSOCIATION may afford to individuals of every profession.

Section D.——Zoology and Botany.

President,—W. Sharpe Macleay, F. L. S.

Vice-Presidents,—Dr Richardson, Professor Graham, Professor Lindley.

Secretaries,—C. C. Babington, W. Swainson, Rev. L. Jenyns.

Members of Committee,—Thomas Hincks; N. A. Vigors; Rev. F. W. Hope; Pat. Neill; Professor J. S. Henslow; Professor T. S Traill; Earl of Derby; Rev. W. Hincks; John Curtis; P. B. Duncan; J. E. Gray; Charles S. Parker; Rev. J. Yates; J. E. Bowman; T. Eyton; J. P. Selby; C. Horsfall; R. Ball; S. W. Dillwyn; J. N. Walker; A. H. Haliday; J. T. Mackay; Captain James Ross; Sir W. Jardine; R. Harrison; Mr Tinney; H. Sandbach; J. Salisbury; Mr Green; Dr Duncan; F. Archer; G. Cook.

Monday, September 11*th.*

The chair being taken about eleven o'clock, the business of this section was commenced by Dr Traill, (Professor of Medical Jurisprudence, Edinburgh,) exhibiting specimens of the *Argas persicus*, the poisonous bug of the Mianneh of Persia, and making some short verbal remarks regarding it. The bite was said to create a fever similar to that of typhus, and it was considered fatal to sleep in some of the villages near which it abounded. Mr Macleay considered that the specimens exhibited were not true insects, but belonged to the family of the Arachnoideæ, and that among them there were two genera, *Argas* and *Ixodes*. He also did not consider the bite so fatal as stated by Dr Traill, but thought the inflammation might be produced by the serrated rostrum remaining in the puncture; and remarked that, in the Island of Cuba, there existed another poisonous insect belonging to a similar family, which attacks the horses, producing great pain and irritation, but he added, that the horses thus attacked were always considered to be those in best health and condition. Dr Traill persisted in his opinion.

Mr Gray exhibited drawings of a new water lily, sent from British Guiana by Dr Schomburgh. He remarked, that this splendid plant would form a new genus, with characters intermediate between *Nymphea* and *Euryale*, and proposed to name it *Victoria regina*. It was found growing in the river Berbice. The flowers are sweet-scented, the outer petals white, but changing to pink as they expand, and when fully opened showing a flower of from 15 to 18 inches in dia-

meter. The leaf is of an oblong ovate form, from 5 to 6 feet in length, the under side with elevated spinous ribs, as in *Euryale*, and of a rich crimson colour. The edges turn up, and form an erect fringe five inches high, making a frame or border around the leaf, and contrasting finely with the green colour of the upper surface. We have to regret, that neither seeds nor roots were brought home. The drawings are proposed to be engraved and published by the Geographical Society. (See our Plate XII.)

Mr Gray communicated the result of Mr Children's repetition of the experiments made by Mr Cross, for the reproduction of insects from an infusion of silica. Every attention was given that these experiments should be made exactly in the same manner with those performed by Mr Cross, but Mr Children did not succeed in procuring the insects from the infusion. Mr Stuchbury of Bristol had made the experiments with the same result, so also had Mr Golding Bird; and these gentlemen seemed to be of opinion, that the acarus produced by Mr Cross, being a recent species, and one well known as most abundant in all situations, had come from eggs present in the distilled water employed in the experiments, and called into existence by the galvanic influence. The question was, however, left open for future investigation and experiment. Mr Macleay compared the production of the insects by Mr Cross under the galvanic influence to the effect of a high temperature upon the germination of seeds; and compared their vitality to some of the lower animals, which could be revived either after a long series of years, or when apparent life had been completely suspended. Instances were noticed of the germination of grains which had been found in the pyramids, after having lain there upwards of 2000 years, and of the resuscitation of the animals of the genus Vibrio, after having been completely dried. Dr Graham mentioned instances of eggs of insects having preserved their vitality for a long period, and under high temperature, in which Mr Gray agreed, and stated, that the eggs of *Acarus lapicida* have been kept for two years in a dried state, still retaining their vitality; and that he had placed *larvæ* of one of the musca for three days in prussic acid, which, when removed, produced in due time the perfect insect. The above remarks brought on a discussion, whether circulation and respiration were completely suspended during torpidity. Mr Macleay considered that it was so in lower animals, and gave as instances of it the species of *Gordius* and *Filaria*, which could be entirely dried and again revived. Mr Gray concurred in these opinions, while Dr Graham seemed in favour of these functions being only partially suspended.

Rev. T. W. Hope read a letter from Sir Thomas Phillips on the best method of destroying insects which infest books and MSS. Sir Thomas found the wood of his library attacked by Anobium striatum, particularly where beech had been introduced, and appeared to think that this insect was much attracted by the paste employed in binding. He recommended as preservatives against their attacks spirits of turpentine and a solution of corrosive sublimate, and also that the latter substance should be mixed with the paste. In some instances he found the produce of a single impregnated female sufficient to destroy a book. Much unimportant discussion followed the reading of this letter, regarding the best manner of preventing the Coleoptera and their larvæ from destroying objects of natural history. Turpentine and spirit of tar were recommended ; but Mr Gray stated, that the only method pursued in the collections of the British Museum was an abundant supply of camphor, with attention to keeping the rooms dry, warm, and well ventilated. Mr Macleay stated that it was *acari* only which fed on the paste employed in binding books, while it was the larvæ of the Coleoptera only which pierced the boards and leaves. He also recommended dryness and ventilation.

Mr J. Ball read a notice of *Erica Mackaiana*, Babington, from Cunnemara, and exhibited living specimens ; adducing arguments in favour of its being distinct from *E. tetralix*. Mr Mackay made remarks on its distribution, and stated, that another addition to the British flora had been discovered in the *Erica carnea*, found wild within eight miles of the town of Galway.

Tuesday, 12th September.

Mr Macleay read a communication from Captain Ducane of Southampton, on some marine animals. In laying this communication before the section, he stated, in explanation of the objects of the paper, that, while Mr Thompson had observed that the *craw fish* underwent metamorphoses from the young to the perfect state, Rathke of Berlin maintained the reverse, which would be a remarkable fact if proved, to find that a change took place in long-tailed crustacea, while none had been observed in the Brachyurine division. He felt inclined to support Mr Thompson's opinion, considering that gentleman an accurate naturalist, and he could scarcely think that one who had observed the remarkable fact of the cirrhipeds being locomotive and free in their young state, would now be mistaken. The letter about to be read confirmed his views, and showed an instance of an individual, who had not previously attended to natural history, observing and proving the curious transformations which are puzzling our

professed naturalists. Captain Ducane, Mayor of Southampton, had his attention lately directed to marine animals. He found specimens of what, at the time, he considered the common prawn (Palemon serratus) in the ditches of a fen where the tide occasionally entered, and the water was brackish. These were loaded with eggs, and when put into fresh salt water, it was soon afterwards filled with small diaphanous creatures, very different in form from the parent animals. He was not, however, able to keep them more than three days alive—the parent only five or six. Drawings of this animal and the young were shown to Mr Macleay, who discovered at once that it was not a *Palemon*, but a species of some allied genus, perhaps *Crangon*, and on comparing Captain Ducane's drawings with the figure of Mr Thompson, copied from Slabber's work, found them very similar, and almost identical; and this fact he considered went very far to prove the confirmation of that gentleman's observations.

Dr Richardson hinted at the possibility of these young animals being parasitical in the eggs of the Crangon, but Mr Macleay considered it impossible that every egg should contain a parasite. Mr Hope remarked that Zoe had been found parasite on Beroe, while Mr Macleay stated, that he had found the Decapod crustacea parasitical in the Gulf stream, but could not perceive the smallest ground for believing that the young alluded to in Captain Ducane's letter could be animals of this description.

Mr Haliday exhibited engravings (from the Suites des Buffon) of *Argas persicus* and *ixodes*, in illustration of the subject brought forward yesterday by Dr Traill. Mr Macleay remarked, that the term *bite*, which was employed yesterday when describing the wound inflicted by this animal was improper, being produced by the insertion into the skin of a serrated rostrum, which produced great inflammation. He also remarked that the history of this genus was remarkably curious. In Cuba oxen were sometimes covered with them, and when they had sucked their fill, the serrated rostrum breaks off, and the creature makes its way to the nearest stone, under which it may then be found. When brought home, thousands of eggs would be found issuing from the broken rostrum. He, however, did not pretend to say that the eggs were not impregnated by the usual canal, but that he had never seen them produced in any other way than from the opening formed by the abrasure of these parts, which, when the animal became so full, seemed to serve the common purpose of an intestinal and generative opening. These eggs produced a hexapod larva, the young form of the great division Arachnoideæ, of which the Acari are the types.

Mr Babington read a notice of a botanical excursion to Jersey and Guernsey, made during the month of August last. (This paper will appear in our next Number.) *Professor Lindley* stated, that Prof. Augusta, a Spanish botanist, had investigated the flora of the Channel islands, and had made out a list of the plants, so far as he knew them to exist, which was deposited in the libraries of some of the institutions there, and would be serviceable to botanists that might again wish to examine the islands. Mr Forbes bore witness to the similarity of the botany of Jersey to the adjacent coast of France, and stated that *Lamium album* was not found in the Isle of Man.

Mr Allis read a paper on the Sclerotic bones of birds and animals, and exhibited preparations of the bones from the collection of the York Philosophical Society. He commenced by stating, that the opinions expressed by several eminent comparative anatomists were at variance with what he had observed, and cited those of Blumenbach, Carus, Cuvier, Yarrell and Buckland, pointing out in what manner they differed from his own observations; and adduced as an example of the very great variation in the statements of these men, the Eagle-owl, said by Cuvier to contain a series of twenty bones, while Mr Allice could only find fifteen. The greatest number found in any bird he had yet examined was seventeen, the smallest eleven; and he thought, that, from the different form and structure which he had been able to observe, any particular order might be at once distinguished.

Mr Reid communicated a paper on the chemical composition of vegetable fibre,—alluding to the great difficulty which Prof. Henslow had expressed in separating the cellular tissue from membrane, which he now considered comparatively easily accomplished, and that its composition could be therefore correctly ascertained. Prof. Henslow considered that Mr Reid had not yet succeeded in separating the two materials, and that he had not performed the experiments with sufficient care; in which Prof. Lindley concurred, stating that the hollow cells emerge into the petals as well as the stamens, and that Prof. Henslow's meaning had been evidently mistaken.

The Rev. F. W. Hope read some observations on the genus *Filaria*, confining his observations principally to those species which infest insects, and exhibited a specimen of *Steropus ethiops*, with the parasitic Filaria protruding. He considered that the first attack was made in the larva state, and that in this respect they, to a certain degree, resembled the Ichneumons, and might, among Coleopterous insects, assume their part, and be a wise provision for controlling the exuberance of species. All the insects hitherto recorded as in-

fested with these parasites, live in moist places, some of them are entirely aquatic. One species he discovered in a species of Phryganea, though he had not succeeded in detecting it in their larvæ; among the Lepidoptera he had not discovered any. A list of forty species of insects, which were infested with Filaria, was laid before the meeting. Rudolphi considered all the species to be identical; but in this assertion Mr Hope could not agree, having detected several among the Coleoptera, while that in the Phryganea were distinct from all; and he considered that each species, or at least each genus, possessed a species peculiar to it. Several distinct forms even seemed to exist, while the distinction between Gordius and Filaria had not yet been aufficiently marked, and he would now propose, that *Filaria* should be restricted to the form exhibited by the common Guinea worm (F. Medinensis,) and concluded by recommending attention to the species which infested the animals composing our own Fauna.

Mr Duncan asked if Mr Hope had paid sufficient attention to the different species to say that they were distinct in each? Mr Hope said he had, and that he considered they would afford the means of distinguishing the closely allied animals, and that those infesting the higher orders were distinct from the insect parasites. Mr Macleay considered the paper a most valuable one, and thought that each insect contained its peculiar species. He could add to the list on the table, and possessed a spider which contained a Filaria. In an article in the Bibliotheque Universelle, a Filaria is recorded from a specimen of Gryllus. The tenacity of life was also alluded to: that belonging to the Gryllus had remained dried up for several weeks, and when placed in water again revived. Mr Hope concurred in these observations, and stated that he believed the specimen on the table was yet alive, having made various contortions since the insect had been set up.

Mr Bowman read a paper by Mr Gardener on the internal structure of the palm tribe. Mr Gardener is now in the Brazils, making observations on the botany of the country, of which that now communicated was among the first received. It contained some curious observations regarding the manner in which the woody part was produced, assimilating its formation to a certain extent with that of the Coniferæ. Mr Bowman offered to be the medium of communication between Mr Gardener and the Association.

Mr Niven communicated the results of some interesting experiments in reference to vegetable physiology. The experiments were made chiefly upon the Ulmus campestris, or common English elm,

with the view of ascertaining the direction of the sap, and the supposed peculiar principles which allowed it to develope leaves or roots. Mr Niven considered, that there were two constant principles, the one upwards, which he terms the leaf principle, the other downwards, or that producing the roots, and he stated that he thought these could not be controverted. In confirmation he produced a specimen of the elm ringed round about to the depth of one or two layers in the wood. The under surface of the cut part produced young shoots with leaves, while on the upper part of the excision abundance of roots were springing out. Various modifications of the same experiments were detailed. Drawings in illustration of them were exhibited; showing at the same time, that the tree or branch would be supported, and would live for a considerable time, at least when subjected to a very deep incision or insulation of the parts; different trees, however, having various powers of prolonging their existence, or of producing additional wood and bark under the above-mentioned circumstances. Professor Lindley observed, that the experiments were all consonant with the present generally received opinions, but considered roots to be only the wood part sent down by the buds.

Mr Gray made some observations on one or two species of Mammalia preserved in the collection of the Royal Institution. The first was a species of *otter* from Demerara. It is intermediate in form between the common otter or *Lutra*, and the *Enhydra*, is remarkable for the great developement of the webs of the hinder feet, has the tail partially broadened, or fringed with a lateral membrane, and the muzzle is entirely hairy, with nothing bare excepting the edge of the nostrils. Mr Gray considered this animal as being the fourth type of the otters. The next animal was *Thalacinus cynocephalus*, exhibited on account of the very young state of the specimen, which would scarcely exceed four inches in height, and remarked that the teeth now resembled in their formation those of the young seals. Two specimens of Philantombo were shewn, a species of antelope from western Africa, called as above by the natives of Sierra Leone, and which Major H. Smith had described from a young and small specimen in the British Museum under the name of Ant. philantombo; and lastly, a perfect specimen of the Felis gracilis of Dr Horsfield.

Mr Lindley made some additional observations on Victoria regina, which was exhibited yesterday.

Wednesday, 13th September.

The paper brought forward by Dr Traill at last meeting was first

read. It was a case communicated by Dr Williamson, of a young woman, about 21 years of age living in a cellar, who, after much pain and violent paroxysms, voided a large gray slug, after which the annoying symptoms gradually subsided. Mr Jenyns considered the specimen in question, now before the section, to be the *Limax variegatus*, which inhabits cellars; and the Rev. Mr Hope, Mr Curtis, Mr Macleay, and Professor Henslow, mentioned some cases of insects and their larvæ having been passed from the intestines.

Dr Richardson read a communication fromDr Bellingham on the frequent occurrence of *Tricocephalus dispar* in the human intestines. The author considered that it had been erroneously described by former observers, and stated, that it was found in the intestines of almost every one. Some discussion took place on the subject, in which Dr Richardson, Mr Curtis, Mr Selby, and Mr Macleay took part.

Prof. Lindley communicated a paper from Mr Ward on the cultivation of plants without ventilation. These experiments originated from Mr Ward's unsuccessful attempts to rear plants in a confined and smoky situation in London. They were made in small bottles and glass cases of various sizes, and houses of twenty five feet in length. They went to prove the possibility of growing plants under these circumstances, and would be one of the greatest discoveries made in the manner of transporting living plants from distant countries under a varied temperature. Many cases had been already received in this county, and the Messrs Loddiges bore testimony to the success which had already attended the plan. On one occasion, plants were shipped at New Holland at a temperature of 80°; in passing Cape Horn the temperature fell to 20°; at Rio it rose to 100°; afterwards to 120°; and on arriving in England it again fell to 40°; but when taken out they were in perfect condition, notwithstanding the various changes of temperature they had undergone. This method of growing some plants of no great size in our rooms, and of noticing their various modes of growth, might be applied to many purposes of experiment.

Mr Yates read the report from the Committee in Liverpool for growing plants on Mr Ward's plan. The green-house which had been erected on the above construction was stocked with eighty species of plants, and, so far as time had yet been afforded, they appeared to be thriving and fulfilling every expectation. The report gave rise to some interesting discussion on the power possessed by plants to exist in vessels excluding the external air, and also on the practicability of introducing small animals, or at least those of the lower classes, along with the plants. Dr Graham considered, that with

plants no necessity for circulation of air existed, but the vessel must be placed in such a situation as to receive the influence of the sun, for the purpose of causing the leaves to reproduce the atmospheric air. He had found that several of the Cacti throve better in the moist atmosphere of a closed glass, than in the dry state in which they are generally kept, and that he had grown species in his own room in this manner for the last two years, some of which had not received water for eighteen months. The plants which the Doctor found to thrive best under this treatment were the Lycopodii, the Grasses, which throve remarkably, Begoniæ and Cacti. Orchideous plants did not thrive under these circumstances; and seed had never been seen to be produced or ripened by any of the plants. Animals he considered could not exist, for the reason that they had no power to reproduce the atmospheric air; and the quantity which they would consume would be so disproportionate to that produced by the plants, as to be either insufficient for their maintenance, or would require vessels much too large for the purpose of convenient experiment. Professor Lindley bore testimony to the importance of this discovery, and to the perfect manner in which some plants had been transported. The *Arucaria* had been brought home and transplanted with the greatest success. He concurred generally with the opinions expressed by Dr Graham.

Mr Bickersteth exhibited the milk from the *Masaranduba tree*, the cow-tree of Humboldt (Galactodendron utile.) Dr Traill remarked that there were two kinds of cow-tree; that he had analysed the juice of the Galactodendron or cow-tree of the Caraccas, which consists principally of wax and resin; but that the juice of the cow-tree of Demerara (botanical name unknown) contains chiefly caoutchouc.

Mr Pooly brought before the meeting an instance which occurred to himself, of three swallows being found on one of the German lakes completely imbedded and frozen up in ice, one of which when uncovered revived and lived for a short time. He inferred from this that the old theory of these birds going under water during winter was tenable. This notice excited considerable interest, and was remarked on by Mr Allis, Mr Hutton, and Mr Selby, and after much cross-questioning, it was generally concluded that the fact did not bear on the question of hybernation, but that the swallows in question might have been those of a very late brood, and being benumbed when in search of food, had been frozen or surrounded with snow, a very short time previous to their discovery.

Mr Gould exhibited drawings of some new Trogons for the continuation of his monograph, and some figures for two new works

which he had in preparation. (See Bibliographical Notices, p. 357.) At the same time he made some observations on the habits of the Trogonidæ, which elicited from various members their opinions of their proper station in the system, which most of the ornithologists present considered to be among the Fissirostres. Mr Macleay made some interesting observations on the T. temnurus (forming the genus Temnurus of Swain.) which is remarkably abundant in the island of Cuba. This species feeds principally on caterpillars which it seizes on the bark and branches of trees; and it was thought that this manner of feeding indicated the propriety of the views held by Mr Swainson, that it exhibited the scansorial type of the genus. The berry-eating species of the Trogons have been found principally, if not entirely, among the Caluri.

Mr Sandbatch exhibited specimens of an undescribed *Prionites* and a *Parus* from the collection of the Royal Institution: for the Motmot he proposed the specific name of "*superciliaris*," from a stripe of ultramarine feathers which stretch over each eye. It is one of the most beautiful of a limited genus, and appeared to be intermediate in the form of the bill between the *Pr. platyrhynchus*, Jard. and Selby, and the ordinary forms, the bill very much depressed, and very finely serrated.

Mr E. Forbes read a notice of several new forms of British animals and plants, making observations on two Mollusca, one allied to *Doris pinnatifida*, the other to the genus Montagua of Dr Fleming. He exhibited also *Asterias rubens* of Johnston. The plants mentioned were a new Polygala, which was described in the report of the Botanical Society of Edinburgh, and a new Euphrasia, distinguished from E. officinalis, by being hairy throughout, and having its fruit placed in an alternate and opposite manner, so as to form four vertical lines, and to give a square appearance to the spike.

Friday, 15th September.

Mr R. Mallet read a communication on the power of aged trees, under certain circumstances, to reproduce themselves from the centre of the trunk. The trees which have been observed to become most generally hollow are the oak, elm, chestnut, beech, cherry, and yew; numerous sketches of remarkable instances of this operation of time and the seasons were exhibited. The meeting did not seem to agree generally with Mr Mallet in his opinions. Professor Henslow and Mr Duncan made observations on the subject.

Mr Smith of Jordan Hill exhibited two new shells dredged from Rothesay Bay, and which had been named *Fusus Boothii*, and *F. umbilicatus*. He also produced fourteen species of fossil shells,

found among recent shells at a higher level than the present high water, and which are not known to exist in a recent state.

Mr Macleay exhibited portions of the pier of Southampton, which had been forwarded to him by Captain Ducane, and which were completely destroyed by the operations of the Limnoria terebrans. Mr Macleay stated that this pier had been erected only a few years since, at an expense of between L. 8000 and L. 10,000, and that its state of decay was now such that it would require to be rebuilt, and would cost nearly a similar sum. Mr Francis suggested, that if the wood had been cayennised, it would have resisted the effects of this destructive insect, and detailed many experiments, by which, under other circumstances, its efficacy had been proved. Mr Francis was requested to bring before next meeting the result of a series of experiments which were now in progress, and also to direct his attention to the power of this preparation in resisting the attacks of insects.

Mr J. E. Gray exhibited some new land shells from the Museum of the Royal Institution, and remarked on their peculiarities. One of more than usual interest was a new species of Anodon, found near Broughton in Craven Yorkshire, and named *A. Roisii*.

The Rev. J. Meade read a paper on the solid materials found in the ashes of plants and animals. This paper went chiefly to prove that the earthy, saline, and metallic ingredients contained in plants, were the maintaining substances of vegetable life.

Mr J. Taylor exhibited a specimen of *Goliathus magnus* from the collection of the Institution; also the jaws of a large shark, and specimen of the oil obtained from its liver. Mr Macleay made some interesting remarks on the history and affinities of Goliathus, but was prevented entering so deeply into the subject as he could have wished from the time of the section being nearly run. The same reason prevented the reading of several other valuable papers which had been entered in the list, particularly one on the affinities of birds by Mr Vigors, in which he proposed to illustrate the subject, and explain some of his views, which the opponents of the circular arrangement had either misconstrued or not understood.

In the Committee of this section, which was not publicly open, the following grants were made from the funds of the association for the purpose of performing experiments. A grant of L. 50 was proposed by Professor Henslow, to be placed at the disposal of the committee in Liverpool, appointed for the purpose of ascertaining the results of experiments made for growing plants in apartments

or cases where the external air was excluded. A greenhouse had been already erected, and the experiments were commenced under the superintendence of Mr Yates. Professor Henslow also proposed that a sum of L. 25 should be placed at the disposal of a committee, for the purpose of ascertaining the best liquors for preserving specimens of animal and vegetable substances. The experiments to be performed at Cambridge under the superintendence of Professor Henslow, Dr Clark Professor of Anatomy, &c. and progress to be reported next meeting.

Some subjects were also recommended as worthy of particular attention, and different individuals and committees were named who agreed to furnish reports, so far as possible, by the next meeting of the Association.——Mr Gray and Mr Bald undertook the examination of the manner in which molluscous animals bore into rocks.——Mr Children engaged to continue his observations into the "Chemistry of Entomology, and the Geographical distribution of insects."——Mr Vigors proposed that a committee should be appointed to prepare a Fauna of Ireland, and should be requested to report progress at next meeting. The gentlemen named were Captain Portloch, Mr R. Bald, Mr William Thompson, Mr Vigors, Mr Halliday, and Dr Coulter, with power to add to the number,—Mr Vigors to act as Secretary.——The Rev. T. W. Hope agreed to prepare a report upon the fossil insects of Great Britain and Ireland. Sir William Jardine was requested to draw up a paper upon the species of the Genus Salmo found in Scotland, giving their specific characters, and noticing the changes which took place in their progress from their young state to maturity. Mr Gould undertook to lay before the next meeting a monograph of the Caprimulgidæ, describing the known species, and entering so far as possible into their habits and affinities.

It was agreed that the next meeting of the *British Association* should take place at Newcastle, in the month of August, the particular day of meeting to be fixed by the Local Committee. The Duke of Northumberland was proposed, and has accepted the presidency.

British Museum.—The new buildings of the British Museum are proceeding, though rather slowly to completion. We are happy to have a good report to make of the part intended to be occupied by the zoological department, for which the accommodation, we understand from good authority, will exceed that of any museum in Europe. The principal gallery is to be that now occupied by the minerals and or-

nithology, with one which is unfinished. The light is from the top, as is well known, but, by an unfortunate oversight in the construction, is much less perfect than it might be. They have completely succeeded in a noble room on the opposite side, which is called the Egyptian Room, and is a model for every purpose of construction. We very much wish before the collections are placed, the authorities would examine into the practicability of altering the lights of the gallery in question. It is a mere question of expense, and we certainly think, in a national building, that ought not to be the first consideration, but that of having it complete and perfect as possible. Nothing can be more admirable than the light in the Egyptian Room, and we regret that in an adjoining wing, which is to be occupied by the minerals, lateral lights have been introduced, which, besides the loss of space they entail, we fear will be found quite insufficient for the purpose. ' An observation has been made in constructing the cabinets worthy of notice. Most persons observe in the mineralogical gallery the glare and reflected lights on the glass windows of the cabinets, owing to the mode of the light falling on them. The corrective to this is found to be, the laying them horizontally or flat, instead of sloping in the usual manner.

On the whole, although these buildings may be open to criticism, we are thankful, considering the mode of laying out the public money in other places, that we shall be comparatively well situated, and we only wish Parliament would hasten the time of their completion by larger grants.—S. C.

Obituary.

Feburary 11th 1837, at Winchester, in his 97th year, John Latham, M. D. F. R., A., and L. SS. Member of the Royal College of Surgeons, and of several foreign learned societies. He was the son of Mr John Latham, a surgeon and apothecary at Eltham, in Kent, where he was born on the 27th June 1740. He was brought up to his father's profession, and pursued it for many years at Dartford, whence he removed, in 1796, to Romsey in Hampshire.——Dr L. was elected a Fellow of the Society of Antiquaries on the 15th of December 1774; and of the Royal Society on the 25th May 1775. In 1788, he was one of the original members or founders of the Linnæan Society, all of whom he survived. The degree of M. D. was unsolicited conferred on him by a foreign university (we believe Vienna) in 1795.——At the age of 80 he retired with his second wife to the house of his son-in-law, W. N. Wickham, Esq. at Winchester, where he remained till his death. In his 82d year this in-

defatigable man began publishing his "General History of Birds," which was completed in 10 vols. 4to. In 1835, he for the first time began to feel the failure of his sight. Infirmities gradually increased on him; but he was still an active and cheerful man, taking his daily walk alone, and scorning the assistance of an arm. Four days before his death he exhibited unusual vivacity; this was followed by a failure of understanding, and he fell into a deep sleep, in which he expired without a pang. Though chiefly known, and most successful as a naturalist, Dr L. was also much attached to antiquities. In a letter to Mr Denne, written in 1797, he remarked, "In respect to natural history and antiquities, I compare myself to Garrick, between Tragedy and Comedy; and, though not so great a man, I cannot help, like him, squinting towards that which pleases me best."—*Extracted from the Gentleman's Magazine for July* 1837.

Dr Latham's works in natural history were confined to Ornithology, in which they were for long the universal text-books, and they are still held in considerable estimation. Cuvier says—"Il a surtout enrichi l'Ornithologie de belles espèces nouvelles; mais ses ouvrages sans critique veulent être lus avec précaution."

On the 6th July 1837, Dr James Woodforde, of Castle Carey, Somerset.—Dr W. completed his medical studies at the University of Edinburgh, where he graduated M. D. in 1825. The year previous he published "*a Catalogue of the Indigenous Phenogamic Plants growing in the neighbourhood of Edinburgh,*"—the result of much industry, and a useful companion in botanical excursions. Can we suppose that in the motto prefixed to this work Dr W. had the anticipation of his own brief career?

"Brevi cadentia hæcce
Brevem docentne vitam?"

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